PIBS 1628E02

HYDROGEOLOGIC STUDY
OF
FRESHWATER AQUIFER
AND
DEEP GEOLOGIC FORMATIONS
SARNIA, ONTARIO

VOLUME II

APPENDICES

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APPENDICES

Report Prepared For:

Detroit, St. Clair, St. Mary's Rivers
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APPENDIX A

Geologic and Hydrogeologic Data
from
Earlier Studies

APPENDIX A1

Hydrogeologic Data
- CN Tunnel

(after Hatch Associates Ltd.,
Golder Associates Ltd., 1985)

Figure A1-1 Geologic Section of CN Tunnel (after Hatch Golder, 1985)

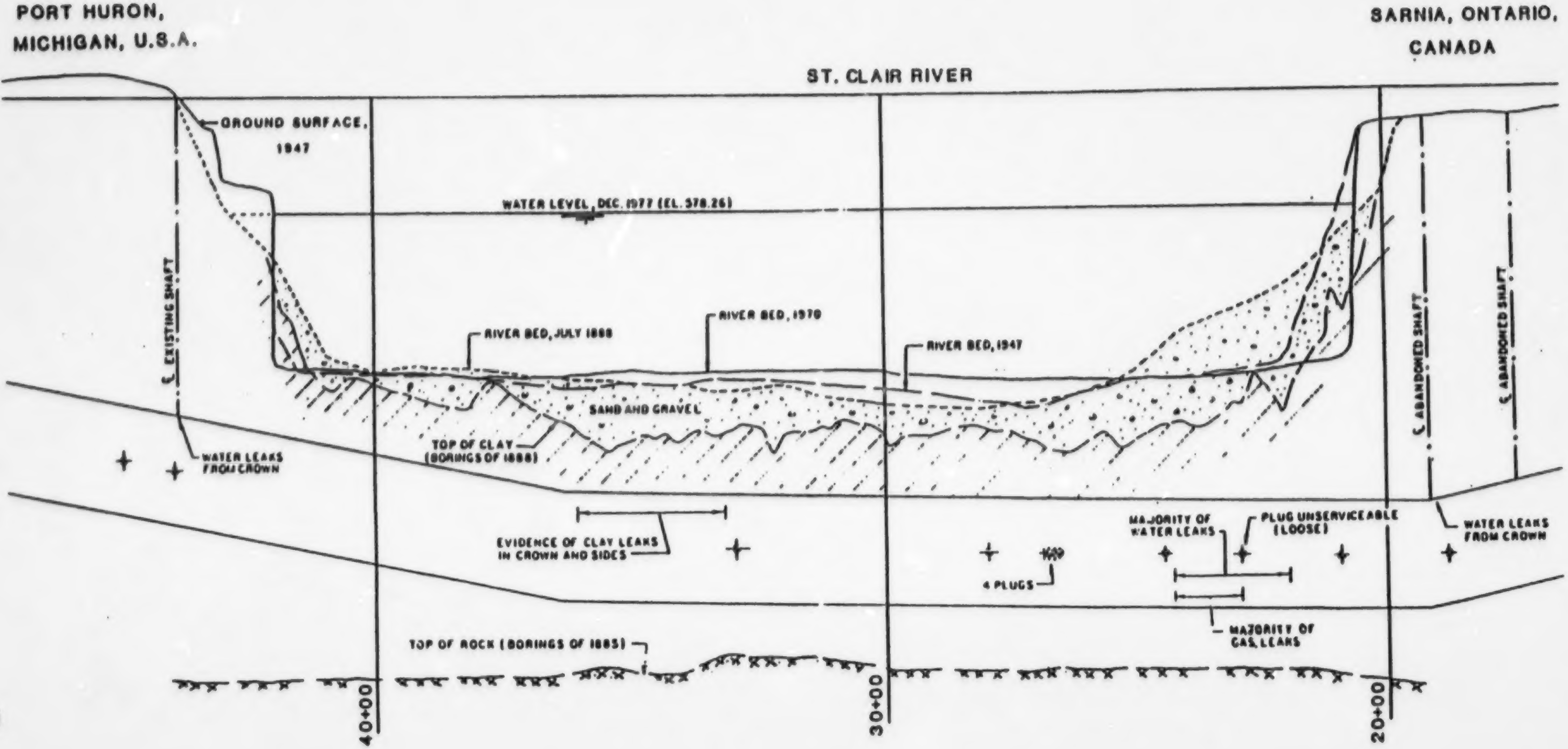

PORT HURON,
MICHIGAN, U.S.A.
SARNIA, ONTARIO,
CANADA
ST. CLAIR RIVER
GROUND SURFACE, 1947
WATER LEVEL, DEC. 1977 (EL. 578.26)
℄ EXISTING SHAFT
℄ ABANDONED SHAFT
℄ ABANDONED SHAFT
RIVER BED, JULY 1888
RIVER BED, 1970
RIVER BED, 1947
SAND AND GRAVEL
TOP OF CLAY (BORINGS OF 1888)
WATER LEAKS FROM CROWN
WATER LEAKS FROM CROWN
EVIDENCE OF CLAY LEAKS IN CROWN AND SIDES
4 PLUGS
MAJORITY OF WATER LEAKS
PLUG UNSERVICEABLE (LOOSE)
MAJORITY OF GAS LEAKS
TOP OF ROCK (BORINGS OF 1885)
40+00
30+00
20+00

Figure A1-2

LOCATION SKETCHES OF PIEZOMETER INSTALLATIONS

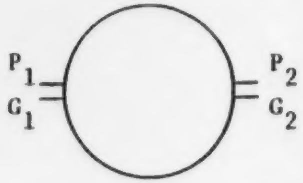
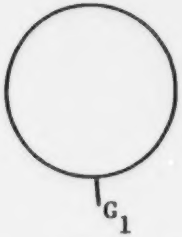
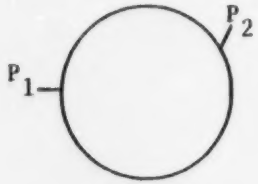
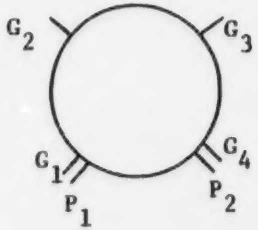
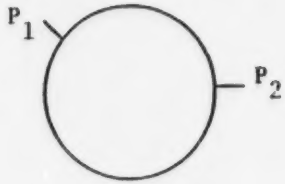
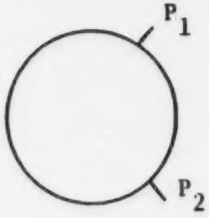
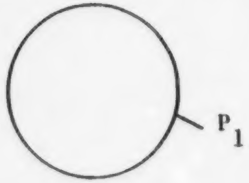
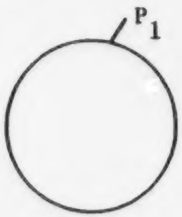
Approximate Location of Installation	Approximate Position of Instrument (looking west in tunnel)	Approximate Location of Installation	Approximate Position of Instrument (looking west in tunnel)
(STATION)		(STATION)	
35+00		24+48	
30+50		24+10	 G_2 G_3 G_1 G_4 P_1 P_2
27+20		22+70	
24+70		19+60	

Table A1-1 Summary of Calculated Hydraulic Conductivities and Inferred Stratigraphy Around CN Tunnel

1985 Station	Piezometer	Average Pressure Head (m)	Calculated Hydraulic Conductivity*						Inferred Stratigraphy
			Oct./78	May/79	July/81	June/82	July/83	Aug./85	
19+60	P1	21	5×10^{-7}	9×10^{-7}	1×10^{-5}	—	—	—	sand and gravel
	P2	24	---	---	7×10^{-10}	4×10^{-10}	5×10^{-10}	2×10^{-10}	silty clay till
22+70	P1	24	2×10^{-6}	2×10^{-6}	1×10^{-5}	7×10^{-6}	7×10^{-6}	7×10^{-6}	sand and gravel
	P2	16	1×10^{-8}	1×10^{-6}	—	7×10^{-10}	2×10^{-8}	2×10^{-9}	silty sand
	W1	22	---	—	--	3×10^{-6}	7×10^{-6}	1×10^{-5}	sand and gravel
24+10	P1	19	3×10^{-10}	2×10^{-10}	3×10^{-10}	2×10^{-10}	3×10^{-10}	2×10^{-10}	silty clay till
	P2	18	gas	gas	2×10^{-6}	5×10^{-6}	1×10^{-5}	1×10^{-5}	sand and gravel
	G1	18	7×10^{-7}	2×10^{-6}	8×10^{-8}	5×10^{-9}	1×10^{-6}	3×10^{-7}	silty sand
	G2	13	1×10^{-9}	2×10^{-10}	9×10^{-11}	3×10^{-10}	6×10^{-10}	2×10^{-10}	silty clay till
	G3	15	3×10^{-9}	2×10^{-10}	1×10^{-10}	4×10^{-10}	1×10^{-10}	2×10^{-10}	silty clay till
	G4	19	6×10^{-7}	1×10^{-6}	1×10^{-10}	6×10^{-10}	1×10^{-8}	2×10^{-9}	silt
24+48	G1	20	5×10^{-10}	5×10^{-10}	---	---	---	---	silty clay till
24+70	P1	17	1×10^{-6}	---	4×10^{-6}	2×10^{-6}	2×10^{-6}	8×10^{-7}	silty sand

Table A1-1 Summary of Calculated Hydraulic Conductivities and Inferred Stratigraphy Around CN Tunnel (cont'd)

1985 Station	Piezometer	Average Pressure Head (m)	Calculated Hydraulic Conductivity*						Inferred Stratigraphy
			Oct./78	May/79	July/81	June/82	July/83	Aug./85	
27+20	P1	8	3×10^{-9}	2×10^{-10}	4×10^{-10}	4×10^{-10}	4×10^{-10}	4×10^{-10}	silty clay till
	P2	3	DRY	9×10^{-10}	---	---	2×10^{-9}	1×10^{-9}	silty clay till
30+50	P1	8	DRY	2×10^{-10}	5×10^{-10}	2×10^{-10}	3×10^{-10}	8×10^{-11}	silty clay till
	P2	8	5×10^{-9}	3×10^{-10}	2×10^{-10}	1×10^{-10}	1×10^{-10}	3×10^{-10}	silty clay till
35+00	P1	9	1×10^{-9}	3×10^{-10}	2×10^{-10}	2×10^{-10}	2×10^{-10}	1×10^{-10}	silty clay till
	P2	22	5×10^{-10}	1×10^{-10}	8×10^{-11}	8×10^{-11}	8×10^{-11}	4×10^{-11}	silty clay till
	G1	15	7×10^{-10}	4×10^{-10}	2×10^{-10}	2×10^{-10}	2×10^{-10}	2×10^{-10}	silty clay till
	G2	40	5×10^{-10}	1×10^{-10}	9×10^{-11}	8×10^{-11}	8×10^{-11}	8×10^{-11}	silty clay till

*Assuming steady radial flow to piezometer of length 0.20 m, radius 20 mm and withdrawal head equal to average pressure head

Table A1-2 Summary of 1985 Water Quality Data* - CN Tunnel
(from Hatch Associates - Golder Associates, 1985)

New Station		pH	Chloride Cl	Sulfate SO_4	Total Fe	Phenols	TOC
35+00	P1	8.3	80	2	<0.05	-	-
	G1	8.2	175	2	<0.05	<0.02	<0.5
	P2	8.3	80	10	-	-	-
	G2	8.2	65	20	<0.05	<0.02	<0.5
30+50	P1	8.6	100	15	0.15	<0.02	-
	P2	8.2	35	30	-	-	-
27+20	P1	8.3	185	5	<0.05	<0.02	-
	P2	8.1	800	20	<0.05	<0.02	-
24+70	P1	8.3	1300	11	0.19	0.52	<0.5
24+10	P1	8.2	280	11	0.24	0.03	<0.5
	G1	8.0	155	2	0.30	<0.02	<0.5
	P2	7.6	6000	14	3.00	0.15	5.0
	G2	7.9	70	126	0.08	<0.02	-
	G3	8.3	40	4	<0.05	<0.02	-
	G4	8.0	6000	14	0.52	0.12	8.0
22+70	P1	7.2	10	16	1.85	<0.02	<0.5
	P2	8.1	435	2	<0.05	<0.02	<0.5
	Well* Point	7.1	15	33	1.24	<0.02	<0.5
19+60	P1	-	-	-	-	-	-
	P2	4.8	600	16	7.60	0.03	4.5

*All results in mg/L

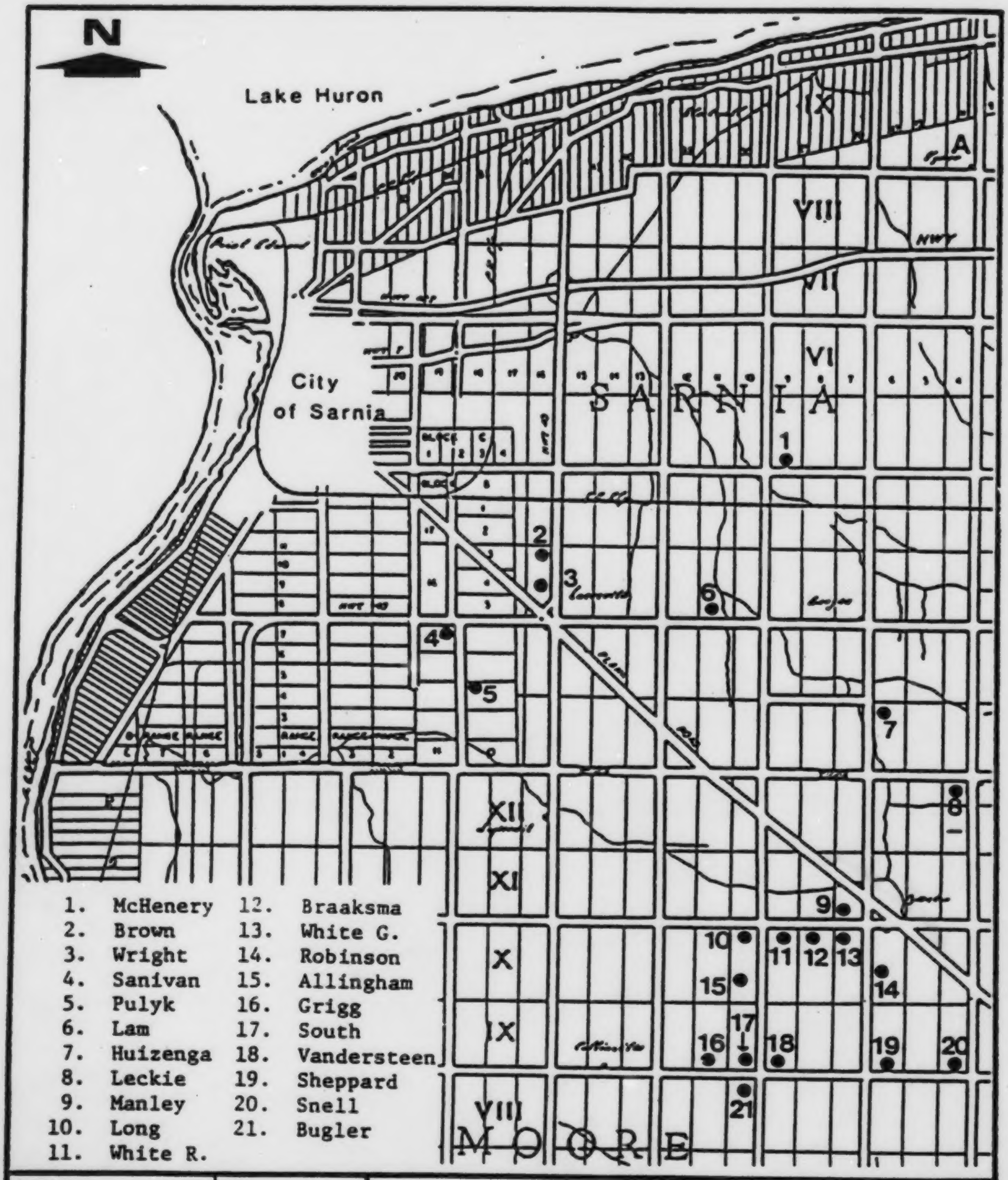
APPENDIX A2

Water Quality of Domestic Wells in Sarnia and Moore Townships Lambton County

Fresh Water Aquifer

Analysis for: Sodium, Chloride, Conductivity,
Dissolved Organic Carbon, Phenol

Sampling and Analysis performed by
Ontario Ministry of the Environment


N
Lake Huron
City of Sarnia
SARNIA
MOORE
A
IX
VIII
VII
VI
XII
XI
X
IX
VIII
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
1. McHenery
2. Brown
3. Wright
4. Sanivan
5. Pulyk
6. Lam
7. Huizenga
8. Leckie
9. Manley
10. Long
11. White R.
12. Braaksma
13. White G.
14. Robinson
15. Allingham
16. Grigg
17. South
18. Vandersteen
19. Sheppard
20. Snell
21. Bugler

Drawn by	Date
Checked by	Date
Revisions	Date

LOCATION OF DOMESTIC WATER WELLS IN FRESH WATER AQUIFER IN SARNIA AND MOORE TOWNSHIP, SAMPLED BY MOE

INTERA Technologies

0 1 2 3 4 Km

FIGURE A2-1

Table A2-1 Water Quality Results, Domestic Wells in Sarnia and Moore Townships, Lambton County (cont'd)

Well Owner	Township	Sampling Date	Na mg/L	Cl mg/L	Conductivity umhos	DOC mg/L	Phenol ug/L
Brown	Sarnia	Nov. 1985	255	248	1470	0.6	<1.0
		July 1984	265	245	1470	1.3	<1.0
		May 1983	—	240	1350	—	<1.0
		Oct. 1982	—	280	1340	—	<1.0
		March 1981	270	285	1410	—	7.0
		May 1980	276	300	1400	—	<1.0
Huizenga	Sarnia	July 1984	420	560	2450	0.8	<1.0
		May 1983	—	650	2390	—	<1.0
		Oct. 1982	405	640	2370	—	<1.0
		Sept. 1981	425	630	2390	—	<1.0
		May 1980	400	670	2420	—	<1.0
Lam	Sarnia	Nov. 1985	580	860	3370	0.1	<1.0
		July 1984	555	615	3150	0.9	<1.0
		May 1983	—	790	2890	—	<1.0
		Oct. 1982	550	770	2870	—	<1.0
		March 1981	520	730	2700	—	<1.0
		May 1980	530	790	2790	—	<1.0
McHenery	Sarnia	Nov. 1985	310	382	1850	<1.0	<1.0
Pulyk	Sarnia	Nov. 1985	240	240	1320	1.1	<1.0
		July 1984	255	232	1260	1.6	<1.0
		May 1983	—	262	865	—	<1.0
		Oct. 1982	250	260	1280	—	<1.0
		March 1981	248	260	1270	—	<1.0
		May 1980	250	275	1270	—	1.0
Sanivan	Sarnia	Nov. 1985	210	152	1140	1.3	1.0
		July 1984	210	155	1080	1.7	<1.0
Wright	Sarnia	Nov. 1985	220	205	1220	1.3	<1.0
		July 1984	240	185	1220	1.6	<1.0
		May 1983	—	230	1210	—	<1.0
		Oct. 1982	—	240	1210	—	<1.0
		March 1981	246	240	1250	—	<1.0
		May 1980	250	270	1280	—	<1.0

— Analysis not performed

Source: Ministry of the Environment (London) Laboratories

Table A2-1 Water Quality Results, Domestic Wells in Sarnia and Moore Townships, Lambton County (cont'd)

Well Owner	Township	Sampling Date	Na mg/L	Cl mg/L	Conductivity umhos	DOC mg/L	Phenol ug/L
Allingham	Moore	Nov. 1985	155	120	905	2.0	<1.0
		July 1984	150	130	885	2.1	<1.0
		May 1983	—	130	1120	—	<1.0
		Oct. 1982	—	135	885	—	<1.0
		Sept. 1981	172	122	870	—	<1.0
		June 1980	173	135	870	—	<1.0
Braaksma	Moore	Nov. 1985	275	235	1470	0.7	<1.0
		July 1984	286	198	1410	1.0	<1.0
		Oct. 1982	—	225	1360	—	<1.0
Bugler	Moore	Nov. 1985	220	188	1140	1.2	<1.0
Grigg	Moore	Nov. 1985	200	220	1200	0.9	<1.0
		July 1984	218	205	1150	1.5	<1.0
Leckie	Moore	July 1984	256	300	1410	1.0	1.5
		May 1983	—	335	1160	—	<1.0
		Oct. 1982	—	325	1385	—	<1.0
		Sept. 1981	254	300	1380	—	<1.0
		May 1980	248	330	1370	—	<1.0
Long	Moore	Nov. 1985	205	180	1080	1.1	<1.0
		July 1984	200	205	1160	1.1	<1.0
		May 1983	—	200	1700	—	<1.0
		March 1982	178	158	950	—	<1.0
		Sept. 1981	208	175	1110	—	<1.0
		June 1980	210	205	1140	—	<1.0
Manley	Moore	Nov. 1985	290	330	1770	0.5	<1.0
		July 1984	300	340	1700	1.0	<1.0
		May 1983	—	370	—	—	<1.0
		Feb. 1982	292	350	1660	—	<1.0
		Sept. 1981	298	325	1660	—	<1.0
		June 1980	315	360	1720	—	<1.0
Robinson	Moore	Nov. 1985	570	705	2940	0.3	<1.0
		July 1984	675	690	3050	0.6	<1.0
		Oct. 1982	—	800	3000	—	<1.0

— Analysis not performed

Source: Ministry of the Environment (London) Laboratories

Table A2-1 Water Quality Results, Domestic Wells in Sarnia and Moore Townships, Lambton County (cont'd)

Well Owner	Township	Sampling Date		Na mg/L	Cl mg/L	Conductivity umhos	DOC mg/L	Phenol ug/L
Sheppard	Moore	Nov.	1985	235	228	1340	1.4	<1.0
		July	1984	610	910	3700	—	<1.0
		Oct.	1982	—	275	1310	—	<1.0
		Sept.	1981	262	235	1330	—	<1.0
		June	1980	255	260	1340	—	<1.0
Snell	Moore	Nov.	1985	500	68	2700	<0.1	<1.0
		July	1984	435	700	830	0.3	<1.0
		May	1983	—	1030	1720	—	<1.0
		Oct.	1982	—	710	2550	—	<1.0
		Sept.	1981	470	695	2550	—	<1.0
		June	1980	435	705	2580	—	<1.0
South	Moore	Nov.	1985	200	180	1150	0.1	<1.0
		July	1984	2.8	2.5	144	3.1	2.0
		May	1983	—	190	1095	—	<1.0
		Oct.	1982	—	11.0	450	2.2	<1.0
Vandersteen	Moore	Nov.	1985	310	252	1565	1.4	<1.0
		July	1984	328	205	1550	1.4	<1.0
		May	1983	—	260	2560	—	<1.0
		Oct.	1982	—	17.0	366	1.7	<1.0
		Sept.	1981	338	250	1550	—	<1.0
		June	1980	355	270	1570	—	1.5
White G.	Moore	Nov.	1985	695	1100	4150	—	<1.0
		July	1984	720	1120	4250	—	<1.0
		May	1983	—	1240	4150	—	<1.0
		Oct.	1982	—	1240	4100	—	<1.0
		Sept.	1981	780	1280	4350	—	<1.0
		June	1980	755	1270	4270	—	<1.0
White R.M.	Moore	Nov.	1985	280	248	1400	0.9	<1.0
		July	1984	300	210	1520	1.0	1.5
		May	1983	—	280	1480	—	<1.0

— Analysis not performed

Source: Ministry of the Environment (London) Laboratories

APPENDIX A3

Water Chemistry of Permeable Limestone Layer at 72-74 m depth - Hamilton Group (after Gartner Lee and Associates Ltd., 1987)

TABLE A3-1

PUMPING TEST SAMPLE ANALYSES
THE HAMILTON GROUP OF FORMATIONS
DUPLICATE SAMPLES FOR EACH SAMPLING PERIOD

Analysis						
Sampling Time, h	0		1		8	
Sample ID.	A-1	A-2	B-1	B-2	C-1	C-2
pH	8.86	8.79	8.39	8.29	7.80	7.81
Conductivity, µmhos	31000	31000	37000	36000	22000	22000
Phenol, wppm	14	14	14	14	10	10
Total Dissolved Solids, wt%	3.4	3.3	4.0	4.1	2.3	2.0
Total Suspended Solids, wppm	2168	2058	1368	648	240	390
Ammonia, wppm	18.2	19.1	23.7	21.4	13.5	12.8
Oil/Grease, wppm	4.5	5.0	4.5	3.8	2.3	2.0
H_2S, wppm	89	90	100	101	153	153
RSH, wppm	5	4	1	1	3	2
Antek Nitrogen, wppm	19	17	19	21	7	7
Alkalinity (to pH 4.2), wppm	547	560	431	420	175	163
Chlorides, wppm	203	210	243	245	70	71
Total Carbon, wppm	67	60	74	82	43	53
Total Inorganic Carbon, wppm	3	1	2	1	6	12
Total Organic Carbon, wppm	64	59	72	81	37	41
Anions, wppm						
F^-	-	-	-	-	-	-
PO_4^{3-}	-	-	-	-	-	-
Br^-	19	18	30	31	10	9
NO_3^-	15	15	21	31	<10	<10
SO_4^{2-}	1840	1840	2300	2600	860	820

- indicates not detectable

- Sampled on 86-07-05

Note: RSH = mercaptans

TABLE A3-1 (cont'd) PUMPING TEST SAMPLE ANALYSES
THE HAMILTON GROUP OF FORMATIONS
DUPLICATE SAMPLES FOR EACH SAMPLING PERIOD

DUPLICATE SAMPLES FOR EACH SAMPLING PERIOD

Sampling Time, h	0		1		8	
Sample ID.	A-1	A-2	B-1	B-2	C-1	C-2
Metals						
Ag	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Al	<0.10	0.55	1.54	0.64	0.85	1.00
B	0.28	<0.10	<0.10	<0.10	<0.10	<0.10
Ba	0.80	1.15	1.37	0.94	1.61	1.43
Ca	553.5	597.0	625.5	603.0	399.4	390.8
Cd	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Co	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cr	<0.10	<0.10	0.14	0.14	0.23	0.20
Cu	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fe	<0.10	0.20	<0.10	0.13	0.13	0.82
Ir	0.80	<0.10	<0.10	0.22	0.16	<0.10
K	84.0	81.4	91.0	90.1	38.1	42.2
Mg	382.0	380.5	453.0	500.5	311.0	298.0
Mn	0.37	0.40	0.58	0.33	0.34	0.41
Mo	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Na	8960	9100	10235	11710	5525	5155
Ni	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
P	0.70	<0.10	0.18	<0.10	<0.10	0.29
Pb	0.10	3.14	1.26	1.11	2.96	1.43
Pd	<0.10	0.14	<0.10	0.25	<0.10	0.15
Pt	<0.10	0.24	<0.10	0.19	<0.10	<0.10
Si	5.90	4.19	3.59	2.79	3.98	3.57
Sn	<0.10	<0.10	<0.10	<0.10	0.24	0.16
V	0.24	0.19	0.15	<0.10	0.18	<0.10
Zn	<0.10	<0.10	<0.10	<0.10	<0.10	0.14
As	<0.10	<0.10	0.14	<0.10	<0.10	<0.10
Be	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ti	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Se	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

APPENDIX A4

Water Chemistry of Detroit River Group
(after Gartner-Lee and Associates Ltd., 1987)

TABLE A4-1 WATER CHEMISTRY OF DETROIT RIVER GROUP (AFTER GLAL, 1987)

WELL	DEPTH (m)	HARDNESS	TOTAL SOLIDS	IRON	SODIUM	POTASSIUM	CALCIUM	MAGNESIUM	TOTAL HALIDES (AS SILVER HALIDE)	SULPHATE	SULPHITE	H_2S	BICARBONATE ALKALINITY	PHENOLS (ug/L)	pH	CHLORIDES	ALKALINITY	SPECIFIC GRAVITY	REFERENCE
CIL DISPOSAL WELL #1 (1968) LOT 2, CON. 15 SOMBRA TWP.	238		56,740	NIL	11,500	146	2,600	1,440	108,200	2,120	6		105		7.6			1.036	McLean, 1968
	259		65,446	NIL	15,800	220	2,400	1,920	131,700	2,200	16		202		7.2			1.041	McLean, 1968
	303		378,878	NIL	41,000	2100	16,160	5,208	421,800	860	150		99		6.6			1.146	McLean, 1968
IMP. SOMBRA 8-XIV (1963) LOT 8, CON. 14	222		114,310	NIL	30,560*		5,702	2,897	--	872		NIL	55		6.9	65,000		1.075	McLean, 1968
IMP. SARNIA INDIAN RESERVE #1 WELL (~1961)	198											<0.1		6000	7.3	28,000			Esso Files
SOURCE UNKNOWN	?	10,640		80						1,850				NIL	9.6	15,900	1,190		Contained in an application submitted to the MOE by W. Glover for a CDL Disposal well in Lot 7, Con. XI Moore Twp.
CDL DISPOSAL WELL #2 (1971)	168		26,190	4.2	6,060		1,688	1,025				<0.04			6.8	13,420			Analysis by J.P. McLean Ltd., 1971

NOTE: Analyses in mg/L unless otherwise stated

* Na + K

APPENDIX A5

Average Concentrations of Wastes Injected into the Detroit River Group of Formations

Table A5-1	Esso (from GLAL, 1987)
Table A5-2	Sun Oil
Table A5-3	Shell Canada
Table A5-4	Polymer Corp.

Water Quality Analyses from Flowing Wells

Table A5-5	Capital Theatre and Esso
Table A5-6	Esso Rock Wells
Table A5-7	Port Huron, Michigan

TABLE A5-1 **AVERAGED CONCENTRATIONS OF WASTES INJECTED INTO THE DETROIT RIVER GROUP OF FORMATIONS** - ESSO (from GLAL, 1987)

CHEMICAL PARAMETERS	DISPOSAL WELL #1					
(Concentrations in mg/L)	1966	1967	1969	1970	1971	1972
H_2S	1200	1200				
pH	12.0-12.8	12.0-12.8				
phenols	100	100				
HCN	0	0				
Alkalinity	6000-12000	6000-12000				
Sodium (Na)	12-40	12-40				
Mercaptans	1000	1000				
NaOH			100000	20000	100000	100000
Na Phenolate			100	20	50	
Na Sulphide			41000	8000	40000	
Sulphide						40000
Ammonium Hydroxide				1100		

CHEMICAL PARAMETERS	DISPOSAL WELL #2						
(Concentrations in mg/L)	1964	1966	1967	1969	1970	1971	1972
H_2S	2500	1200	1200				
pH	12.5	12.0-12.8	12.0-12.8				
phenol	85	100	100	75			
HCN		0	0				
Alk.							
Na	4900	12-40	12-40				
Mercaptans		1000	1000				
NaOH					20000	100000	100000
Na Phenolate					20	50	
Na Sulphide					8000	40000	
Sulphide				10			40000
Ammonium Hydroxide					1100		
Chloride	< 20						

NOTE: Sulphide concentrations are reported as "sulphide" and as "H_2S" in different analyses.

TABLE A5-1 (cont'd) **AVERAGED CONCENTRATIONS OF WASTES INJECTED INTO THE DETROIT RIVER GROUP OF FORMATIONS** - ESSO (from GLAL, 1987)

CHEMICAL PARAMETERS (Concentrations in mg/L)	DISPOSAL WELL #3 1966	1967	1969	1970	1971	1972
H_2S	500	500				
pH	9-10	9-10				
phenols	500	500	100	100	100	100
HCN	0	0				
Alk	-	-				
Na						
Mercaptans						
NaOH						0
Na Phenolate						
Na Sulphide						
Sulphide			30	30	30	0
Ammonium Hydroxide						
Chloride						

CHEMICAL PARAMETERS (Concentrations in mg/L)	DISPOSAL WELL #4 1966	1967	1969	1970	1971	1972
H_2S	2000-12000	2000-12000	50000	9000		
pH	9.0-12.5	9.0-12.5				
phenol	2000	2000	150	150	150	470
HCN	5	5				
Alk.	1000	50000				
Na	1000	1000				
Mercaptans	1000+	1000+				
NaOH					9000	3500
Na Phenolate						
Na Sulphide						
Sulphide			12000	100	100	100
Ammonium Hydroxide						
Chloride						

TABLE A5-1
(cont'd)

AVERAGED CONCENTRATIONS OF WASTES INJECTED INTO THE DETROIT RIVER GROUP OF FORMATIONS - ESSO (from GLAL, 1987)

CHEMICAL PARAMETERS	DISPOSAL WELL #5					
(Concentrations in mg/L)	1966	1967	1969	1970	1971	197
H_2S	2000-12000	2000-12000				
pH	9.0-12.5	9.0-12.5				
phenols	2000	2000	150	150	150	4
HCN	5	5				
Alk	1000	50000				
Na	1000	1000				
Mercaptans	1000+	1000+				
NaOH			50000	9000	9000	550
Na Phenolate						
Na Sulphide					100	1
Sulphide			12000	100		
Ammonium Hydroxide						
Chloride						

NOTES:
- Data extracted from EPC files.
- During late Sept. to mid-Dec. 1972, phenol discharges to DW4 and DW5 increased with the following 'spot checks':

  Oct. 3/72 - 12,500 mg/L
  Nov. 10/72 - 28,000 mg/L
  Dec. 8/72 - 10,000 mg/L
  Dec. 14/72 - 11,300 mg/L

- In Nov. 1970 a memorandum stated the following general information regarding waste water composition:

  DW1 and DW2; ammonia, spent caustic, phenolic water
  DW3; phenolic wastes
  DW4 and DW5; spent caustic, sour and phenolic water

- In June 1967, injected water was characterized as follows:

  H_2S; 1200 mg/L
  pH; 9-12
  phenol; 200 mg/L
  Alkalinity; 9000 mg/L
  Chloride; 50 mg/L

TABLE A5-1 (cont'd) AVERAGED CONCENTRATIONS OF WASTES INJECTED INTO THE DETROIT RIVER GROUP OF FORMATIONS - ESSO (from GLAL, 1987)

Analysis

Sample ID.	DW2-A	DW2-B	DW2-C
Sampling Time, min.	30	60	90
pH	12.0	11.9	11.9
Conductivity µmhos	14,500	14,500	14,500
Phenol, wppm	66	121	142
Total Dissolved Solids, wt%	2.52	2.80	2.62
Total Suspended Solids, wppm	72	120	85
Ammonia, wppm	279	345	328
Oil/Grease, wppm	6.5	4.8	5.2
H_2S, wppm	129	125	123
RSH, wppm	9672	9652	9735
Alkalinity (to pH 4.2), wppm	6542	6491	6071
Chlorides, wppm	5986	5872	5875
Antek Total Nitrogen, wppm	326	325	316
Anions, wppm			
Br^-	1510	1290	1340
SO_4^{2-}	2960	2950	2970
F^-	-	-	-
NO_2^-	-	-	-
NO_3^-	-	-	-
PO_4^{3-}	-	-	-
Total Carbon, wppm	320	327	331
Total Inorganic Carbon, wppm	1	1	1
Total Organic Carbon, wppm	319	326	330

- Indicates non-detectable

- Sampled on 86-08-87

TABLE A5-1 AVERAGED CONCENTRATIONS OF WASTES INJECTED INTO THE (cont'd) DETROIT RIVER GROUP OF FORMATIONS - ESSO (from GLAL, 1987)

Sample ID.	DW2-A	DW2-B	DW2-C
Metals			
Fe	0.67	<0.10	0.31
Ir	2.75	<0.10	0.17
V	0.45	0.13	<0.10
Ti	<0.10	<0.10	<0.10
As	<0.10	<0.10	<0.10
Zn	1.59	<0.10	<0.10
Se	0.44	<0.10	<0.10
B	3.58	3.01	2.67
Mn	<0.10	<0.10	<0.10
Pt	<0.10	<0.10	0.50
Mg	0.22	0.25	0.37
P	1238.0	1604.0	2026.0
Be	<0.10	<0.10	<0.10
Cd	<0.10	<0.10	<0.10
Cu	1.58	1.32	1.12
Ag	<0.10	<0.10	<0.10
Sn	0.61	0.48	0.48
Ca	120.8	230.0	407.4
Ni	0.10	<0.10	<0.10
Si	1.07	0.81	0.70
Al	<0.10	<0.10	<0.10
Cr	<0.10	<0.10	<0.10
Ba	0.16	0.12	0.14
Mo	0.28	0.15	0.37
Pb	0.97	0.44	0.45
Co	<0.10	<0.10	<0.10
Pd	<0.10	<0.10	0.12
Na	6093.0	6195.0	6500.0
K	68.39	75.05	76.43

Table A5-2 Average Composition of Waste Injected into the Detroit River Group of Formations - Sun Oil Disposal Well

Parameter (mg/L)	1968	1969	1970	1972	1973
pH	8.3	9.5	9.2	9.4	9.5
phenols	480	670	315	173	150
fluorides	0.71	130	15	180	150
chloride	1384	62	180	190	180
alkalinity	--	7800	2880	3312	6000
oil	--	640	58.5	--	trace
total solids	--	3785	1869	1980	2000
dissolved solids	--	3710	1836	1890	1950
H_2S	--	--	6528	1730	2000
ammonia	--	--	2509	2000	2000
COD	--	--	10200	10480	10000
sulphides	1256	--	--	--	--

Data from Ontario Department of Mines and Northern Affairs Annual Summary Report

Waste Description: Refinery phenolic and sour waters, neutralized acid, caustic wastes

Table A5-3 Average Composition of Waste Injected into the Detroit River Group of Formations - Shell Canada Ltd. Disposal Well #1

Parameter (mg/L)	1962	1964	1970	1971
Phenols	257	500	464	337
Suspended Solids	--	13	--	--
Sulphide as H_2S	--	2000	--	--
Oils	95	--	--	--

Data from Ontario Department of Mines and Northern Affairs Annual Summary Report

Waste Description: Water soluble compounds leached from crude oil fractions and cracked products

Table A5-4 Average Composition of Waste Injected into the Detroit River Group of Formations - Polymer Corp. Ltd.

Parameter (% weight)	1968
sodium hydroxide	6.0
sodium hydrosulphide	4.0
sodium carbonate	1.0
phenolic compounds	0.5

Data from Ontario Water Resources Commission (1968)

Waste Description: Spent caustics

TABLE A5-5 WATER QUALITY ANALYSES FROM CAPITAL THEATRE AND ESSO FLOWING WELLS

ONTARIO WATER RESOURCES COMMISSION
TABLE OF WATER ANALYSES

AREA OF SURVEY SARNIA

DATE Sept 29/72

Source and Number	Location and Owner	Date Sampled		pH	Mineral Constituents in parts per million (ppm)											TOC			Suspended	Total	Sulphide
					Calcium (Ca)		Sodium (Na)		Sulphate (SO4)		Chloride (Cl)			Total Dissolved Solids		ppm		Phenol ppb	Solids ppm	Sulphur ppm	as H2S
T22-221	Flowing Well Capital Theatre	May 30		8.6			1450		1450		3960			9210		86			220	310 490	150 12
T22-222	Flowing Well Capital Theatre	May 30																2000			
T22-219	Flowing Well Imperial Oil	May 30		9.0	800		4900		2000		6450			18,110					1970	1800	1250
T22-220	Flowing Well Imperial Oil	May 30																500,000			
Imperial Oil Laboratory	Water Well Imperial Oil [illegible]	July 28		7.2							405							80			Nil
Imperial Oil Laboratory	Water Well Imperial Oil [illegible]	July 28		7.0							428							60			Nil
Imperial Oil Laboratory	Waste Imperial Oil			9.4							9400							900,000			350

TABLE A5-6 WATER QUALITY ANALYSES FROM FLOWING ESSO ROCK WELLS

ANALYSES OF ROCK WELL WATER

Location	Marvelube Pumphouse	Pkg. Plant.
Distance from Outbreak	900 ft.	780 ft.
Depth of Well	139 ft.	125 ft.
Analysis *		
pH	7.2	7.2
H_2S, ppm	Nil	Nil
Phenols, ppb	120	120
Chlorides, ppm	9.6	5.8
NaOH, ppm	Nil	Nil

* Samples from well bottom July 13/72

Reference: Letter from H.S. Wilson, Esso Chemical to Mr. D. McLean, Department of Natural Resources, August 15, 1972

TABLE A5-6 WATER QUALITY ANALYSES FROM FLOWING ESSO ROCK WELLS (cont'd)

ANALYSES OF ROCK WELL WATER

Date - July 28/72

Location	Marvelube Pumphouse	Package Plant
Distance from Outbreak	900 ft.	780 ft.
Depth	139 ft.	125 ft.
Analysis		
pH	7.2	7.0
H_2S, ppm	NIL	NIL
Phenols, pph	80	60
Chlorides, ppm	405	428
NaOH, ppm	NIL	NIL

Analysis of Waste Water

pH	9.4
H_2S, ppm	350
Phenol, ppb	900,000
Chlorides, ppm	9,400
NaOH, ppm	264

Reference: Letter from H.S. Wilson, Esso Chemical to Mr. D. McLean, Department of Natural Resources, August 15, 1972

TABLE A5-7 WATER QUALITY ANALYSES FROM FLOWING WELLS IN PORT HURON, MICHIGAN

ONTARIO WATER RESOURCES COMMISSION
CHEMICAL LABORATORIES

WATER ANALYSIS

All analyses except pH reported in p.p.m. unless otherwise indicated

1 p.p.m. = 1 mgm. / litre = 1 lb./100,000 Imp. Gals.

Municipality: Port Huron, Mich.

Source: Oil Wells

Date Sampled: June 26/67 **by:** WDB

Report to:
W.D. Brittain
Dept. of Energy & Res. Mgt.
880 Bay St.
Toronto 5, Ont.

c.c. Chem. Lab.-*
A. Redekopp
General Manager-

br

Lab. No.	Hardness as $CaCO_3$	Alkalinity as $CaCO_3$	Iron as Fe	Chloride as Cl	pH at Lab.	Fluoride as F	Apparent Colour Units	Turbidity Units	Sodium as Na	SOLIDS Tot.	SOLIDS Susp.	SOLIDS Diss.
W 5333				53260					**	**	2894	**
W 5334				38140					21100	102694	10	102684
	Sulphate as SO_4	Potassium as K	Calciu as Ca	Magnesiu as Mg	Cyanid as HCN	Sulphide as H_2S	Phenols in ppb.	Ether Solubles	Special Gravity			
W 5333	1712	**	2920	1584	0.0	0.0	20	0	**			
W 5334	2905	130	2680	1512	0.0	1000	250	7	1.049 at 78°F.			

** Sample exhausted, test could not be performed

DP - 67
- 36

W 5333 1. Well - Head, Oil Well

W 5334 2. " " " "

APPENDIX B

Report on the Analysis of Organic Contamination in Groundwater Samples from the Sarnia Area

(after Barringer-Magenta Ltd., 1988)

W.D. #5571D/

REPORT ON THE ANALYSIS OF ORGANIC CONTAMINANTS IN GROUNDWATER SAMPLES FROM THE SARNIA AREA

Prepared for:

The Ontario Ministry of the Environment
Detroit/St. Clair/St. Marys River Project
265 Front Street North, Suite 109
SARNIA, Ontario
N7T 7X1

Prepared by:

Barringer Laboratories
5735 McAdam Road
MISSISSAUGA, Ontario
L4Z 1N9

Government Purchase Order No. A00643
Requisition No.: 133347

August 1988

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1. INTRODUCTION

This report describes the analysis of organic contaminants in groundwater samples from the Sarnia area. Fresh water aquifier samples were analyzed from three sets of shallow wells drilled respectively in 1985, 1986 and 1987. Also, samples were analyzed which were taken at various depths from a deep borehole.

Samples were analyzed for volatile organics, base-neutral and acid extractables and organochlorine contaminants. Sample data are reported in the Appendix. Methodologies employed are described in Section 2. A discussion of the results is given in Section 3.

2. ANALYTICAL METHODOLOGY

2.1 VOLATILE ORGANIC CONTAMINANTS

This section describes the protocols for sample containers, analytical methodology, instrumentation and quality control procedures that were followed for the analysis of volatile organic contaminants. The compounds reported for this analysis along with their detection limits are given in Table 2.1.1.

2.1.1 Sample Containers

Sample bottles (60 ml amber glass - Supelco Inc., Cat. No. 2-3229), caps and teflon-lind septa (Supelco Inc., Cat. No.'s 2-3264 and 2-3242) were supplied by Barringer to the Ministry. Sufficient bottles were provided to allow for duplicate collection of each sample. The bottles were washed with detergent followed by thorough rinsing with tap water and organic-free water. The bottles were then dried at 105°C. Additional bottles cleaned in an identical manner were filled with organic-free water to serve as field blanks. These were transported to the field where sample collection took place and then returned to the laboratory intact. Samples were transported in coolers with freezer packs and stored under refrigeration until ready for analysis. All samples were analyzed within 7 days from date of receipt.

2.1.2 Analytical Procedure and Instrumentation

The methodology used closely followed U.S. E.P.A. Method 624(1). Two significant modifications made were the use of 25 ml rather than 5 ml sample volumes and the use of a capillary GC column rather than a packed column. This allowed for improved detection limits compared to those with the EPA method.

TABLE 2.1.1

Compounds Reported for Volatile Organics Analysis With Corresponding Method Detection Limits

Compound	Detection Limit (ug/l)	Compound	Detection Limit (ug/l)
(a) EPA Priority Pollutants			
Acrolein	25.0	1,2-Dichloroethane	1.0
Acrylonitrile	10.0	1,1-Dichloroethene	1.0
Benzene	0.5	trans-1,2-Dichloroethene	0.5
Bromodichloromethane	1.0	1,2-Dichloropropane	1.0
Bromoform	2.0	cis-1,3-Dichloropropene	1.0
Bromomethane	2.0	trans-1,3-Dichloropropene	1.0
Carbon tetrachloride	0.5	Ethylbenzene	0.5
Chlorobenzene	0.5	Methylene chloride	1.0
Chloroethane	5.0	1,1,2,2-Tetrachloroethane	2.0
Chloroform	0.5	Tetrachloroethene	0.5
Chloromethane	5.0	Toluene	0.5
Dibromochloromethane	2.0	1,1,1-Trichloroethane	0.5
1,2-Dichlorobenzene	0.5	1,1,2-Trichloroethane	2.0
1,3-Dichlorobenzene	0.5	Trichloroethene	0.5
1,4-Dichlorobenzene	0.5	Trichlorofluoromethane	2.0
Dichlorobromomethane	1.0	Vinyl chloride	5.0
1,1-Dichloroethane	0.5		
(b) Other Compounds			
1-Bromo-2-chloroethane	2.0	Isopropylbenzene	0.2
1,2-Dibromoethane	2.0	Pentachloroethane	1.0
Dibromomethane	2.0	Propylbenzene	0.2
Dichloroacetonitrite	15.0	Styrene	0.5
cis-1,2 Dichloroethane	0.5	1,2,4-Trichlorobenzene	1.0
1,2-Diethylbenzene	0.2	1,1,2-Trichloro-1,22-tricfluoroethane	2.0
1,3-Diethylbenzene	0.2	1,2,3-Trimethylbenzene	0.2
1,4-Diethylenzene	0.2	1,2,4-Trimethylbenzene	0.2
1-Ethyl-2-Methylbenzene	0.2	1,3,5-Trimethylbenzene	0.2
1-Ethyl-3-Methylbenzene	0.2	m-Xylene	0.5
1-Ethyl-4-Methylbenzene	0.2	o-Xylene	0.5
Hexachloro-1,3-butadiene	0.5	p-Xylene	0.5
Hexachloroethane	1.0		

Sample aliquots were taken in a gas tight syringe (Hamilton No. 1025 TLL), spiked with internal/surrogate standard solution (Table 2.12) and introduced to the sparge vessel of the purge and trap device. For the first sampling round a CDS 320 Purge and Trap Concentrator was used with conditions described in Table 2.13. For the remaining three sampling rounds a Tekmar Model LSC-2 Purge & Trap Concentrator combined with a Tekmar Model ALS Autosampler were used. Conditions are provided in Table 2.14. After purging the sample was desorbed from the trap via a heated interface line to a Perkin Elmer Sigma 3B Gas Chromatograph which was coupled via a direct capillary transfer line to the source of a Finnigan Model 1020B Mass Spectrometer. Gas Chromatographic conditions are provided in Table 2.15. Mass spectrometer operating conditions are provided in Table 2.16.

2.1.3 Standard Solutions

Standard cocktail solutions for the U.S. E.P.A. volatile Priority Pollutant Compounds were obtained from Supelco Inc. (Purgeable A - Cat. No. 4-8851, Purgeable B - Cat. No. 4-8852, Purgeable C - Cat. No. 4-8853). For the remaining compounds, individual stock solutions were prepared from the pure compounds. These individual solutions were used to prepare standard cocktails of non-priority pollutant compounds. The final working standard solutions for calibration were prepared fresh each week from the Priority Pollutant and non-Priority Pollutant cocktail solutions. All standard solutions were made in methanol and stored in teflon-lined screw cap vials of appropriate volume to minimize headspace. Solutions were kept in the laboratory freezer when not in use. Standard solutions for QC spiking purposes were prepared in an identical manner, but were made using independently prepared or purchased stock solutions.

TABLE 2.1.2

Internal (I.S.) and Surrogate (S.S.) Standards for Volatiles Analysis

Bromochloromethane (I.S.)

1-Chloro-2-bromopropane (S.S.)

1,4-Dichlorobutane (I.S. & S.S.)

4-Bromofluorobenzene (S.S.)

TABLE 2.1.3

Purge and Trap Conditions (CDS 320 Concentrator)

PURGING MODE:	Purge Vessel	: 30 ml capacity
	Sample Volume	: 25.0 ml
	Purge Gas	: Helium @ 40 ml/min.
	Purge Time	: 8 min.
	Purge Temperature	: 28±2°C
DESORB MODE:	Desorb Gas	: Helium @ 2 ml/min
	Desorb Time	: 10.0
	Desorb Temperature	: 180°C
	Transfer Line Temp.	: 230°C
TRAP CONSTRUCTION:	25 cm stainless steel, 1/8" OD	
TRAP PACKING:	1 cm 3% SP-2100 on 60/80 Chromosorb WAW 15 cm Tenax TA, 60/80 mesh 8 cm silica Gel Grade 15, 35/60 mesh	
TRAP BAKEOUT:	Temperature	: 225°C
	Time	: 15 min.

TABLE 2.1.4

Purge and Trap Conditions (Tekmar)

INSTRUMENTATION:	Tekmar Model LSC-2 Purge and Trap Sample Concentrator Tekmar Model ALS Autosampler		
PURGING MODE:	Purge Vessel	:	30 ml capacity
	Sample Volume	:	25.0 ml
	Purge Gas	:	Helium @ 40 ml/min.
	Wet Purge Time	:	8 min.
	Dry Purge Time	:	6 min.
	Purge Temperature	:	28±2°C
DESORB MODE:	Desorb Gas	:	Helium @ 2 ml/min
	Desorb Time	:	10.0
	Desorb Temperature	:	220°C
	Transfer Line Temp.	:	Approx. 100°C
TRAP CONSTRUCTION:	25 cm stainless steel, 1/8" OD		
TRAP PACKING:	7.5 cm Carbopack B, 60/80 mesh 1.3 cm Carboseive S-III, 60/80 mesh (obtained from Supelco Inc. Cat. No. 2-0321)		
TRAP BAKEOUT:	Temperature 280°C Time 15 min.		

TABLE 2.1.5

Gas Chromatographic Conditions

(a) First Sampling Round

INSTRUMENTATION: Perkin-Elmer Sigma 3B

ANALYTICAL COLUMNS: VOCOL Wide Bore Capillary
60 m X 0.75 mm ID, 1.0 um Film
(Supelco Inc., Catalog #2-3731)

CARRIER GAS: Helium, 2 ml/min.

COLUMN OVEN:
Initial Temperature : 50° C
Initial Time : 16 min
Program Rate : 4° C/min.
Final Temperature : 186°C

INJECTOR TEMPERATURE: 230°C

PURGE/TRAP TRANSFER LINE TEMPERATURE: 230°C

(b) Second, Third, and Fourth Sampling Rounds

INSTRUMENTATION: Perkin-Elmer Sigma 3B

ANALYTICAL COLUMNS: J & W DB-624 Capillary
30 m X 0.32 mm ID, 1.8 um Film
(J & W Catalog #2-3731)

CARRIER GAS: Helium, 2 ml/min. @ 8 psi head pressure

COLUMN OVEN:
Initial Temperature : 40° C
Initial Time : 15 min
Program Rate : 4° C/min.
Final Temperature : 160°C

INJECTOR TEMPERATURE: 200°C

PURGE/TRAP TRANSFER LINE TEMPERATURE: Approx. 100°C

TABLE 2.1.6

Mass Spectrometer Operating Conditions

INSTRUMENTATION:	Finnigan Model OWA 1020B Mass Spectrometer 1050 Super Incos/OWA Software/Hardware Upgrade 70 Mbyte Winchester Disk Drive 20 Mbyte Streaming Tape Back-up System
MASS RANGE:	45-300 AMU
SCAN RATE:	2.0 sec/scan (7.84 ms/AMU)
MS TRANSFER LINE TEMPERATURE:	220°C
SOURCE TUNING:	Using Perfluorotributylamine (PFTBA) as per Finnigan's specifications. 4-bromofluorobenzene (BFB) spiked into all samples. Mass spectrum of BPB compared with mass abundance ratio criteria of U.S. E.P.A. Method 624 to confirm tuning.

The internal/surrogate standard solution which was spiked into every sample was prepared from a stock solution obtained from Supelco (Cat. No. 4-8864) and from a solution of 4-bromofluorobenzene prepared in the laboratory. This solution was prepared fresh weekly in a 10 ml volumetric flask using organic-free water as solvent. The contents were immediately transferred to five 2 ml teflon-lined screw cap vials and stored in the refrigerator when not in use. A fresh vial was taken for each working day and discarded at the end of the day.

2.1.4 Data Processing

Spectra for each of the target compounds were obtained by running standards. The spectra were reduced to the 3 to 10 most significant masses and from these reduced spectra a reverse search library was created.

Data files were processed using Finnigan Super Incos Data System Autoquan Software. The reverse search routine looks for each target compound within a specified retention time window. The reverse library spectrum of the target compound is compared to the mass spectra of any peaks found within the retention time window of the sample file. For each peak, a FIT calculation is made which measures the degree to which the library spectrum is included in the unknown spectrum. A FIT of 1000 indicates that all library masses occur as masses in the unknown; and for those masses in common, all the intensities are exactly proportional. A FIT of 0 indicates that none of the masses in the library spectrum occur in the sample spectrum. A FIT threshold of 850 was specified for all of the target compounds. If no peaks are found within the retention time window which exceed the FIT threshold, the target compound is denoted as "NOT FOUND".

If a peak is found which meets the above criteria, an amount is calculated using a single quantitation mass. The amount is calculated by:

$$\text{AMOUNT}_X = \frac{\text{AREA}_X \times \text{AMOUNT}_{IS}}{\text{AREA}_{IS} \times \text{RESPONSE FACTOR}_X}$$

where AREA_X and AREA_{IS} are the intensities of the quantitation mass for the target compound and internal standard respectively, AMOUNT_{IS} is the amount of internal standard spiked into the sample, and RESPONSE FACTOR_X is the response factor for the compound relative to the internal standard determined from the daily standard run.

All computer reports were checked and any questionable assignments were manually confirmed or corrected if necessary. If the concentration for a particular compound in a sample was large enough to exceed the linear quantitation range, a repeat injection of the sample was made at an appropriate dilution. The amount for the compound found for the diluted sample multiplied by the appropriate dilution factor would then be reported.

Computerized forward library searches were performed on all samples using an NBS Mass Spectral Data Base of 42,000 compounds. AlL peaks in the chromatogram due to non-target compounds whose areas represented greater than 5 ug/l compared to the internal standard were searched. The names and mass spectra of the 3 best matches based on fit criteria were printed. Amounts were calculated based on an area comparison with the internal standard. Results of the library searches have already been submitted to the Ministry.

2.1.5 Quality Control

An initial multipoint calibration was performed by analyzing standard solutions containing the target compounds at 5 different concentrations throughout the working range of the analysis. Response factors relative to the internal standard were calculated for each compound at each concentration. Response factors were found to be constant within EPA guidelines over the working range for all compounds (i.e. less than 35% Relative Standard Deviation from the mean).

At the beginning of each working day the instrument was tuned and then a reagent blank consisting of 25 ml organic-free water spiked with internal/surrogate standard solution was analyzed. Checks were made for background contamination, relative and absolute responses of internal/surrogate standards, and mass ratios of 4-bromofluorobenzene using EPA mass abundance criteria. If the results were unacceptable, appropriate adjustments were made and the reagent blank analysis was repeated.

Once an acceptable blank was obtained, a daily calibration standard consisting of 25 ml organic free water spiked with internal/surrogate standard solution and target compound calibration standard solution was analyzed. The response factor for each compound was calculated and compared to the mean value obtained from the multipoint calibration. U.S. E.P.A. Method 624 provides individual acceptance criteria for each compound. Since the E.P.A. method calls for the use of a packed column and higher standard concentrations then used here, the E.P.A. criteria do not apply specifically to our conditions. Consequently we adopted an acceptability criterion of ±40% deviation between the multipoint calibration mean response factor and the daily standard response factor for the 4 volatile gases (chloromethane, chloroethane, vinyl chloride, and bromomethane) and an accepability criterion of ±30% for all other compounds. The compounds in the daily standards usually met these criteria which are generally more stringent than those given in the E.P.A. method. If successive analyses of daily calibration standards showed a definite trend of compounds falling outside the QC limits, then the multipoint calibration procedure was repeated using a freshly prepared set of standards. If the daily standard was found to be acceptable, then the response factors for that day were stored in the calibration table and used for quantitation of subsequent sample runs.

Each sample was spiked with internal/surrogate standard solution. Percentage recoveries of surrogate standards are comparisons of surrogate responses in the sample to those in the daily calibration standard and as such provide a measure of precision. Large deviations from 100% recovery; for a particular sample may indicate matrix effects or a problem with the analysis. Surrogate standard recovery data are included with the sample data in the appendix.

Duplicate analyses were performed on approximately 10% of the samples. These are designated at "QC-REPEAT" in the appendix. Blind duplicates for certain samples were provided by the Ministry and results are included under the designation DUPLICATE. Results of additional blind quality assurance/quality control samples submitted by the Ministry have been designated as QA/QC. Results for field blanks are also included with the data.

Approximately 5% of samples were spiked with the same target compound calibration mix used for the daily standard. Spike recovery data from these spiked samples provide another indicator of precision and indicate whether matrix effects are important. As an additional QC measure a similar number of spiked reagent blanks were analyzed. These consisted of 25 ml organic-free water spiked with internal/surrogate standard mix and an independently prepared QC target compound calibration mix. These QC spikes were used to confirm the accuracy of the daily calibration standards. Target compound spike recovery data are provided in the Appendix following the sample data.

2.2 BASE-NEUTRAL AND ACID EXTRACTABLE ORGANIC CONTAMINANTS

This section describes sampling containers, analytical methodology, instrumentation, and quality control procedures that were followed for the analysis of base-neutral and acid extractable organics. The base-neutral extractable compounds reported for this analysis are given in Table 2.2.1. The acid extractable compounds reported are given in Table 2.2.2.

2.2.1 Sample Containers

Amber glass sample bottles (Dominion Glass, 1 liter Metric Round) and caps with 28 mm diameter teflon liners (Supelco Inc.) were supplied to the Ministry for sampling. The bottles were solvent rinsed with dichloromethane (Caledon, Distilled in Glass) and dried in an oven at 105°C. Additional bottles cleaned in a similar manner were filled with organic-free water to serve as field blanks. Samples were transported in coolers with freezer packs and stored under refrigeration until ready for extraction. All samples were extracted within 7 days of receipt.

TABLE 2.2.1

Base-Neutral Extractable Compounds Reported with the Corresponding Method Detection Limits

Compound	M.D.L. (ug/l)	Compound	M.D.L. (ug/l)
(a) EPA Priority Pollutants			
Acenaphthene	0.5	1,3-Dichlorobenzene	0.5
Acenaphthylene	0.5	1,4-Dichlorobenzene	0.5
Anthracene	0.5	3,3'-Dichlorobenzidine	10.0
Benzo(a)anthracene	2.0	Diethylphthalate	0.5
Benzo(b)fluoranthene	3.0	Dimethylphthalate	0.5
Benzo(k)fluoranthene	3.0	2,4-Dinitrotoluene	0.5
Benzo(a)pyrene	3.0	2,6-Dinitrotoluene	1.0
Benzo(ghi)perylene	5.0	Di-n-octylphthalate	2.0
Benzyl butyl phthalate	2.0	Fluoranthene	0.5
Bis(2-chloroethyl)ether	0.5	Fluorene	0.5
Bis(2-chloroethoxy)methane	2.0	Hexachlorobenzene	1.0
Bis(2-ethylhexyl)phthalate	3.0	Hexachlorobutadiene	0.5
Bis(2-chloroisopropyl)ether	2.0	Hexachloroethane	0.5
4-Bromophenyl phenyl ether	0.5	Indeno(1,2,3-cd)pyrene	3.0
-Chloronaphthalene	0.5	Isophorone	0.5
-Chlorophenyl phenyl ether	1.0	Naphthalene	0.5
Chrysene	1.0	Nitrobenzene	0.5
Dibenzo(a,h)anthracene	3.0	N-Nitrosodi-n-propylamine	5.0
Di-n-butylphthalate	0.5	Phenanthrene	0.5
1,2-Dichlorobenzene	0.5	Pyrene	0.5
		1,2,4-Trichlorobenzene	0.5
(b) Other Compounds Reported			
Hexachlorocyclopentadiene	10	1-Methylnaphthalene	0.5
Benzidine	15.0	2-Methylnaphthalene	0.5
		N-Nitrosodiphenylamine	1.0

TABLE 2.2.2

Acid Extractable Compounds
Reported and the Corresponding Method Detection Limits

Compound	M.D.L. (ug/l)	Compound	M.D.L. (ug
(a) EPA Priority Pollutants			
4-Chloro-3-methylphenol	1.0	2-Nitrophenol	2.0
2-Chlorophenol	1.0	4-Nitrophenol	5.0
2,4-Dichlorophenol	1.0	Pentachlorophenol	3.0
2,4-Dimethylphenol	1.0	Phenol	0.5
2,4-Dinitrophenol	10.0	2,4,6-Trichlorophenol	2.0
2-Methyl-4,6-dinitrophenol	10.0		

2.2.2 Glassware Cleaning

All non-disposable glassware used for the analysis was cleaned by soaking for one hour in an aqueous solution of RBS-35 alkaline cleaning solution (Chromatograhic Specialties Ltd., Cat. No. P27952), scrubbing with a brush, and rinsing thoroughly with tap water. This was followed by rinsing with distilled water, then with acetone (Caledon, Distilled in Glass) and oven drying at 130°C. After washing was completed, glassware was stored in a clean, dust-free environment.

2.2.3 Analytical Procedures

The methodology used was similar to U.S. E.P.A. Method 625(2). Modifications are described below:

Sample volume was adjusted to 800 ml by decanting excess. If less than 800 ml volume was provided, the volume was noted and appropriate corrections were made to the final results. 1 ml of surrogate standard spiking solution (Table 2.2.3) was added to each sample before extraction.

The pH was adjusted to greater than 11 with 6 N sodium hydroxide. Three extactions were performed with 60 ml aliquots of dichloromethane (Caledon, Distilled in Glass). The extracts were filtered through predried and prerinsed sodium sulfate and combined in a round bottom flask. The pH of the sample was then adjusted to less than 2 with 6N sulfuric acid and three more extractions were carried out with 60 ml portions of dichloromethane. For the first round of shallow well samples, base-neutral and acid fractions were concentrated and analyzed separately. For the last three rounds of shallow well samples and for all deep well samples, the base-neutral and acid fractions were combined before concentration and analyzed in a single fraction.

TABLE 2.2.3

Surrogate Standards for Base-Neutral and Acid Extractable Analyses

Base-Neutral Extractables:

Nitrobenzene-d5
2-Fluorobiphenyl
Terphenyl-d_{14}

Acid Extractables:

Trifluoro-m-cresol
2,4,6-Tribromophenol

For the first sample round extractions were carried out directly in the sampling bottles. After each addition of dichloromethane the sample bottles were placed in a rotary tumbler assembly (capacity 12 bottles) and tumbled at a rate of 10 rpm for 30 minutes. Dichloromethane was removed by siphoning using a 100 ml pipet under suction.

For the last three sample rounds, a modification was made to the extraction procedure which eliminated the siphoning step by pipet which was slow and cumbersome. Specially constructed extraction vessels were made from 1 litre Kimax cylindrical separatory funnels with teflon plug stopcocks (Canlab Cat. No. F7830-1L). The ground glass joints at the top were removed by a glassblower and replaced with pieces of threaded glass (Pegasus Corp.) on which screw caps with teflon liners could be placed. Samples were poured into the extraction vessels and extraction was carried out using a rotary tumbler as described above. The top threaded cap was removed to add the sample and reagents and replaced during tumbling. The dichloromethane layer was drained by opening the bottom stopcock.

Concentration of the sample extracts to a volume of 5 to 10 ml was performed using a rotary evaporator. Extracts were then transferred to 15 ml glass graduated centrifuge tubes and concentrated to a final volume of 2 ml by impinging a stream of dried purified nitrogen onto the solvent surface with gentle heating on a water bath (35°C). The concentrated extracts were capped and refrigerated until ready for analysis. Prior to analysis the centrifuge tubes were removed from refrigeration, allowed to come to room temperature and topped up to 2.0 ml if any evaporation had occurred. All extracts were spiked with internal standard solution (Table 2.2.4) prior to GC/MS analysis.

TABLE 2.2.4

Internal Standards (I.S.) Compounds for Base-Neutral and Acid Extractable Analyses

Base-Neutral Extractables:

Anthracene-d_{10} (I.S. for Base-neutrals and acids)

Benzo(a)anthracene-d_{12} (I.S. for Base-neutrals)

Decafluorotriphenylphosphine (evaluation compound for E.P.A. mass abundance ratio criteria)

2.2.4 Standard Solutions

The surrogate standard solution (Table 2.2.3) which was spiked into all samples before extraction was prepared in acetone. The internal standard solution (Table 2.2.4) which was spiked into all final extracts before analysis was prepared in dichloromethane. For the U.S. E.P.A. Priority Pollutant base-neutral and acid extractable compounds, standard cocktail solutions were obtained from Supelco Inc. (Cat. No. 4-8900, 4-8901, 4-8904, 4-8905, 4-8906). Individual stock solutions were prepared for 1-methylnapthalene and 2-methylnapthalene from the pure compounds. Daily calibration standards were prepared in dichloromethane using appropriate amounts of the internal standard solution, surrogate standard solution, Priority Pollutant cocktails and methylnapthalene stocks. The target compound spiking mix which was spiked into reagent blanks and samples for QC purposes was made in acetone using independently prepared Priority Pollutant cocktails and methylnapthalene stocks.

2.2.5 Instrumentation and Data Processing

Analysis was performed using a Varian 3400 Gas Chromatograph interfaced to a Finnigan INCOS 50 Mass Spectrometer. Gas chromatograph operating conditions are given in Table 2.2.5. Operating conditions for the mas spectrometer are given in Table 2.2.6. Data processing was performed in the same manner as for volatile organics as described in Section 2.1.4.

2.2.6 Quality Control

An initial multipoint calibration was performed by analyzing standard solutions containing the target compounds at several different concentrations throughout the working range of the analysis. Response factors were found to be constant over the range of calibration within E.P.A guidelines (less than 35%

TABLE 2.2.5

Gas Chromatography Operating Conditions for Base-Neutral and Acid Extractable Analyses

INSTRUMENTATION:	Varian 3400 Gas Chromatograph	
ANALYTICAL COLUMN:	J & W DB-5 30 m X 0.25 mm ID, 0.25um Film (J & W Cat. No. 122-5032)	
CARRIER GAS:	Helium, 2.0 ml/min. @ 10 psi head pressure	
COLUMN OVEN:	Initial Temperature	50° C
	Initial Time	0 min.
	Program Rate	5 C°/min.
	Final Temperature	300°C
	Hold Time	8 min.
INJECTOR CONDITIONS:	Split/Splitless Split Vent Closed for 0.5 min. 280°C	
INJECTION VOLUME:	2 ul	

TABLE 2.2.6

Mass Spectrometer Operating Conditions for Base-Neutral and Acid Extractable Analyses

INSTRUMENTATION:	Finnigan Model Incos 50 Mass Spectrometer Data General Micro Eclipse Data Systemrdware Upgrade Super Incos Software Package
MASS RANGE:	45-350 AMU
SCAN RATE:	1.0 sec/scan (3.73 ms/AMU)
MS TRANSFER LINE TEMPERATURE:	290°C
SOURCE TUNING:	Using Perfluorotributylamine (PFTBA) as per Finnigan's specifications. All samples spiked with Decafluorotriphenylphosphine (DFTPP). Mass sepctrum of DFTPP compared with mass abundance ratio criteria of U.S. E.P.A. Method 625 to confirm tuning.

Relative Standard Deviation from the mean) with the exception of the later-eluting polyaromatic hydrocarbons and late-eluting phenols. Calibration curves were set up for these compounds rather than using the average of the response factors over the calibration range.

Following the analysis of the first batch of 8 samples, some modifications were made to the analysis as described below and another multipoint calibration was performed. A second internal standard (benzo(a)anthracene-d12) was introduced for use in quantitation of the later eluting base-neutral compounds (benzyl butyl phthalate to benzo(ghi)perylene). A second surrogate standard (2,4,6-tribromophenol) was added for the acid extractable compounds. Also a routine of daily septum changes and weekly replacement and silanization of the glass injection port liners for the gas chromatograph was implemented. Following these modifications, the precision of response factors for the later eluting PAH's and phenols improved such that the E.P.A. criterion of less than 35% Relative Standard Deviation was attained for all target compounds over the calibration range.

Each day following tuning of the mass spectroemeter a calibration standard with the equivalent of 50 ug/l of each target compound, surrogate standard, and internal standard was run. Tuning was checked by comparing the spectrum of decafluorotriphenylphosphine which was included in the mixture with the E.P.A. mass abundance criteria. Response factors for each target compound in the daily standard were calculated and compared to the multipoint calibration values. Deviations between response factors of the daily standard from the multipoint response values were generally less than ±30%. Multipoint calibrations with fresh calibration standards were repeated periodically throughout the program when evidence of response factor drift became apparent.

Extractions were generally carried out in batches of 12 consisting of 8 samples, 1 reagent blank, 1 duplicate sample, 1 spiked reagent blank, and 1 spiked duplicate sample. When insufficient samples were submitted within a one week period to make a complete batch, a partial batch was extracted containing a reagent blank and at least one QC spike. A minimum of 10% of the samples submitted were run in duplicate.

All samples were spiked with surrogate standard solution. Surrogate standard recovery data are included with the sample data in the appendix. Results for field blanks are given. Results for blind duplicates and QA/QC samples submitted by the Ministry are also included and are designated as "QC-REPEAT" and "QA/QC". Target compound spike recovery data are provided in the appendix following the sample data.

2.3 ORGANOCHLORINE CONTAMINANTS

This section describes sampling containers analytical methodology, instrumentation and quality control procedures that were followed for the analysis of organochlorine contaminants. The compounds reported for this analysis are given in Table 2.3.1.

2.3.1 Sample Containers and Glassware Cleaning

The sample containers and protocol for their cleaning and field blank preparation was identical to that for base-neutral and acid extractables as described in Section 2.2.1. Glassware cleaning was carried out as described in Section 2.2.2. All samples were extracted within 7 days of receipt.

TABLE 2.3.1

Organochlorine Compounds Reported with Method Detection Limits

Compound	M.D.L. (ug/l)
Total PCB's	0.01
Hexachlorobenzene	0.001
Octachlorostyrene	0.001
Heptachlor	0.0005
pp'-DDE	0.0005
Mirex	0.001
Aldrin	0.0005

2.3.2 Standard Solutions

Aroclors 1016, 1221, 1232, 1242, 1248, 1254 and 1260 were obtained in a kit as individual solutions (Supelco Inc., Cat. No. 4-8825). Working standards for calibration were prepared in isooctane for each of the individual aroclors.

For the other oraganochlorine compounds stock solutions were prepared from the pure compounds. A working standard for calibration was prepared in isooctane containing a cocktail of each of the organochlorine compounds.

For spiking of samples. a solution of Aroclor 1254 was prepared in methanol. A spiking cocktail in methanol was also prepared for the other organochlorine compounds.

2.3.3 Analytical Procedure

The analytical procedure was a modification of U.S. E.P.A. Method 608(3). Sample volume was adjusted to 800 ml by decanting any excess. If less than 800 ml volume was provided, the volume was noted and appropriate corrections were made to the final results. Three extractions were performed with 60 ml aliquots of dichloromethane (Caledon, Distilled in Glass). The extracts were filtered through predried and prerinsed sodium sulfate and combined in a round bottom flask.

For the first sampling round, extractions were carried out directly in the sampling bottles using a rotary tumbler as described in Section 2.2.3. For the last three sampling rounds extractions were performed using extraction vessels and a rotary tumbler as described in Section 2.2.3.

Concentration of the sample extracts to a volume of 2 to 5 ml was peformed using a rotary evaporator. This was followed by exchange into hexane (Caledon, Distilled in Glass). Three successive 10 ml aliquots of hexane were added with concentration down to about 2 ml after each addition. The hexane extract was then transferred to the top of a glass column (6 mm I.D.x 280 mm with teflon stopcock and glass joint at the top fitted with a 100 ml reservoir) and packed with preactivated, prerinsed Fluorisil PR (60/100 mesh, Supelco Cat. No. 2-0280). The column was eluted with 30 ml of hexane and the resulting fraction was concentrated and exchanged into isooctane using a rotary evaporator as described above for the initial exchange into hexane. The final extract was transferred to a graduated centrifuge tube, made up to 5.0 ml with isooctane and stored in the refrigerator until ready for analysis.

2.3.4 Instrumentation and Data Processing

Analysis was performed using a Varian 3500 Gas Chromatograph equipped with dual capillary analytical columns and dual electron capture detectors. The use of two capillary columns of different polarity allowed for greater sensitivity and higher confidence in identification than available using the single packed column called for in U.S. E.P.A. Method 608. The operating conditions for the gas chromatograph are given in Table 2.3.2. The two detector signals were output to dual channels of a Spectra-Physics Model SP4270 Computing Integrator. Separate calibration files were stored on both integrator channels for the organochlorine compound mix and for each Aroclor standard.

TABLE 2.3.2

Gas Chromatographic Operating Conditions for Organochlorine Contaminants Analysis

INSTRUMENTATION:	Varian 3500 Dedicated Capillary Gas Chromatograph Equipped with Dual Electron Capture Detectors
CARRIER GAS:	Helium, 2 ml/min.
MAKE-UP GAS:	Nitrogen, 22 ml/min.
COLUMN OVEN:	Initial Temperature : 80° C Initial Time : 0 min. Program #1: Rate : 30 C°/min. Final Temperature : 160°C Hold Time : 0 min. Program #2: Rate : 3.0 C°/min. Final Temperature : 250°C Hold Time : 0 min.
INJECTOR CONDITIONS:	Split/Splitless Split Vent Closed 0.5 min, open thereafter 250°C
INJECTION VOLUME:	2.0 ul
DETECTOR TEMPERATURES:	300°C (Both)
ANALYTICAL COLUMNS A:	J & W DB-5 30 m x 0.25 mm I.D., 0.25 um Film (J & W Cat. #122-5032) (J & W Cat. #DB-1701)
B:	30 m x 0.25 mm I.D., 0.25 um Film (J & W Cat. #122-0732)

The calibration files for the organochlorine compound mix contained entries for compound name, retention time, and response factor. For each sample analysis, a chromatogram and quantitation report was printed for each channel. If a peak did not occur within a specified retention time window (±0.01 min.) for a compound on both channels, then the compound was reported as not detected. If a peak was found on both channels within the specified retention time window and the calculated amounts agreed to within 20%, the average of the two amounts was reported. If peaks were found on both channels and the calculated amounts differed by more than 20%, the assumption was made that the higher value contained a contribution from a coeluting impurity and the lower values was reported with the result flagged.

The calibration files for each Aroclor mix contained retention times and response factors for 5 major peaks characteristic of that Arocolor. In order for an Aroclor to be confirmed, all five peaks had to be found on each channel and the relative peak areas on each channel had to correspond to those of the calibration standard.

2.3.5 Quality Control

An initial three point calibration was performed for the organochlorine compound mix and also for Aroclor 1254. The E.P.A. acceptance criterion of less than 10% relative standard deviation for the response factors throughout the calibration range was met for all compounds. Single point calibrations were performed for the other six Aroclor mixtures which were kept on file and updated periodically.

Each day a blank injection of solvent was made to ensure that the chromatographic system was free from interferences. Next an organochlorine mix calibration standard was analyzed and response factors compared to that of the multipoint calibration. The same was done for an Aroclor 1254 calibration standard. Response factors for the compounds generally fell within E.P.A. Method 608 acceptance criterion of ±15% difference. Multipoint calibrations were repeated periodically when detector sensitivity drifts were noted. Retention times and response factors of the daily standards were placed in the calibration files of the integrator and used for the analysis of subsequent samples.

Extractions were generally carried out in batches of 12 consisting of 8 samples, 1 reagent blank, 1 duplicate sample, 1 spiked reagent blank and 1 spiked duplicate sample. Fifty percent of spikes were performed with the organochlorine compound spiking cocktail and 50% were spiked with Aroclor 1254.

Analytical results are given in the Appendix including results for duplicates, field blanks, and blind duplicates and QA/QC samples submitted by the Ministry. Spike recovery data are presented following the sample data.

3. DISCUSSION OF RESULTS

3.1 VOLATILE ORGANIC CONTAMINANTS

Results for the first batch of volatile samples submitted (4-87, 6-87, 8-87, 87-01, P8-86BL, MD-1 and MD MLS-2) and the field blank showed elevated amounts of chloroform and dichloromethane. With the exception of a trace of dichloromethane, these compounds did not appear in our reagent blanks or in a house blank prepared at the same time as the field blank. An investigation showed that the problem was due to contaminated freezer packs placed in the coolers in which the sample bottles were transported. The freezer packs were discarded and this problem did not recur with future samples.

Traces of dichloromethane generally less than 1 ug/l though occasionally higher were found in most blanks and samples. Care was taken to keep volatile solvents out of the mass spectrometer room during analysis of volatile organics. However, it was sometimes necessary to perform analyses of base-neutrals and acid extractables at the same time as volatile analyses. When base-neutral and acid extractable analyses were taking place, the dichloromethane extracts were stored in capped centrifuge tubes in a fume hood. Syringe aliquots for injection were taken inside the fume hood. Our extraction laboratory was located in a different part of the building from the mass spectrometer room. Although all extractions using dichloromethane were carried out in fume hoods in the extraction laboratory it is possible that traces of dichloromethane may have circulated via the building ventilation system to the mass spectrometer room.

Trichlorofluoromethane was found in most samples typically between 0.2 to 2 ug/l. It was also found in the field blanks at higher levels varying from about 4 to 40 ug/l. However, it was not found to be present in our reagent blanks or house blanks. The source of this contamination is unclear. It appears to have permeated through the teflon-backed silicone septa into the sampling bottles during shipment or sampling. Since field blanks were sitting around longer than samples, they appear to have accumulated greater amounts of this compound.

The fresh water aquifer shallow well samples were found to be free of significant volatile organic contamination. Significant amounts of volatile aromatic hydrocarbons were present in the deep borehole samples. The forward library search results revealed the presence of significant quantities of organosulfur compounds as well. Due to the large amount of benzene and toluene present in these samples, dilution factors of 25 to 100 were required. The samples could not be run undiluted without causing severe contamination of the purge and trap system and the mass spectrometer ion source.

3.2 BASE-NEUTRAL AND ACID EXTRACTABLE CONTAMINANTS

The base-neutral extractable results show the presence of some phthalate ester compounds, particularly di-n-butyl phthalate and bis(2-ethylhexyl) phthalate, in reagent blanks, field blanks and samples. It appears that they are artifacts from sampling and analytical procedures. We attempted to minimize this problem by scrupulous cleaning of glassware and oven baking of the sodium sulfate drying reagent in a muffle furnace at 450°C. Midway through the program we switched from using cellulose filter paper (Whatman No. 42) to glass microfibre filters (Whatman Grade 934-AH). The glass microfibre filters were baked at 450°C. and solvent rinsed before use.

The compound benzidine showed very poor extraction recovery. Although it was observed in our calibration standards, little or none of this compound was recovered after extraction.

The fresh water aquifer shallow well samples did not contain significant amounts of base-neutral or acid extractable compounds. Analysis of the deep borehole samples was complicated by the presence of high amounts of sulfurous material. On adjusting the pH to greater than 11 prior to extraction yellow precipitate came out of solution which had the appearance of elemental sulfur. Mass spectral forward library searches of the sample chromatograms indicated the presence of elemental sulfur and organosulfur compounds in the sample extracts. The acid extractable compound phenol was found in high concentration in the deep borehole samples maximizing at around 40,000 ug/l at a depth of 192 meters. 2,4-dimethylphenol also maximized at this depth at a concentration of about 1,000 ug/l. These values probably underestimate the true levels since extraction recoveries in spiked samples for phenol averaged about 40% and for 2,4-dimethylphenol averaged about 30%. Other alkylphenols were confirmed to be present from the forward library searches, but no chlorophenols or nitrophenols were discovered. In the base-neutral fraction, napthalene was found in concentrations up to about 500 ug/l and methylnapthalenes up to about 150 ug/l also maximizing at 192 meters.

3.3 ORGANOCHLORINE CONTAMINANTS

No significant amounts of the target organochlorine compounds were found in either the fresh water aquifer shallow well samples or in the deep borehole samples. For the shallow well samples of the first sample round, traces of hexachlorobenzene showed up in the samples and reagent and field blanks. This was perhaps due to some coeluting impurity as this compound was not detected for the last three sampling rounds.

As mentioned above, significant quantities of elemental sulfur and organosulfur compounds were present in the deep borehole samples. This created a problem since the electron capture detectors of the gas chromatograph were sensitive to these compounds. When samples were run undiluted, the result was a broad band of impurities saturating out the detectors for most of the chromatogram. Dilution factors of 100 to 20,000 were required in order to get a clean enough baseline to properly quantitate the samples. Consequently detection limits for the organochlorine compounds were elevated.

Between the second and third sample rounds some tests were performed to evaluate the use of activated copper treatment to remove sulfur from the samples. Activated copper was prepared by treating copper powder (BDH Reagent Grade, Precipitated) with 2N HCl to remove surface oxides, rinsing with distilled water followed by acetone, drying under a nitrogen stream, and storing under isooctane to prevent oxidation. About 1 gram of activated copper was added to final extracts of samples with high sulfur content and the contents of the vials were shaken vigorously. The copper treatment was found to effectively remove a great deal of the sulfur containing impurities. An extract spiked with the organochlorine cocktail was analyzed before and after activated copper treatment. The signal for heptachlor was reduced by about 10% and for the remaining compounds was reduced by 25 to 30%. For sample rounds three and four, all final extracts for the deep borehole samples were treated with activated copper. The sulfur content was reduced sufficiently such that these samples could be run undiluted.

4. REFERENCES

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2. Ibid; pp. 153-174

3. Ibid; pp. 89-104

APPENDIX C

Geophysical Logging - Sarnia Boreholes

Work Completed by Groundwater Research Group
Scarborough Campus

University of Toronto

1. INTRODUCTION

During the fall of 1987, the Groundwater Research Group at the University of Toronto undertook comprehensive geophysical logging of boreholes in the town of Sarnia in south western Ontario. One of these boreholes (MDMW-1) was drilled into bedrock to a depth of 300m. The logs from this well are described in Section 2. The remaining five boreholes were drilled simply to penetrate the overburden and ranged from 34 to 73m in depth. These wells are generally referred to as the "shallow boreholes" and are described in Section 3. A summary of the boreholes logged and the types of log run is shown in Table 1.1. The objective of this report is to present and describe the geophysical logs obtained during the study, thereby completing the current programme of geophysical research.

Table 1.1. Summary of Geophysical Logging

	Borehole and Approximate Depth					
Log	OW1-87 37m	OW2-87 47m	OW6-87 34m	OW12-87 73m	OW14-87 40m	MDMW-1 300m
S.P.	*	*	*	*	*	-
16" Normal Resistivity	*	*	*	*	*	*
64" Normal Resistivity	*	*	*	*	*	*
Single Point Resistance	*	*	*	*	*	*
Natural Gamma	*	*	*	*	*	*
Gamma-Gamma	-	-	-	-	-	*
Caliper	-	-	-	-	-	*
Fluid Resistance	-	-	-	-	-	*
Temperature	-	-	-	-	-	*
Differential Temperature	-	-	-	-	-	*

* Log run
- Log not run

2. DEEP BOREHOLE MDMW-1

The deep borehole MDMW-1 was the primary focus of the borehole geophysical investigations. This borehole was drilled towards the end of September, 1987. Following its completion, the borehole was flushed to remove drilling fluids and borehole logging commenced almost immediately, the work beginning on October 1st. As shown on Table 1.1, a relatively full set of logs were run. These logs included 16" and 64" normal resistivity, natural gamma, gamma-gamma (density), caliper, temperature, differential temperature and fluid resistivity. A brief description of the geophysical principles behind these logs is contained in the Appendix. A spontaneous potential (S.P.) log was not attempted as the borehole had been flushed. This type of activity disturbs the equilibrium conditions necessary for the development of stable electrochemical potentials.

The MDMW-1 logs are presented in Figure 2.1. All depths are shown in metres with respect to local ground level. The lithological classifications accompanying the logs were made available by INTERA following a brief, preliminary interpretation of the borehole cores.

2.1 Normal Resistivity, Gamma and Gamma-Gamma Logs

The electric logs (16" normal resistivity (short normal), 64" normal resistivity (long normal), and single point resistance), the gamma log and the gamma-gamma log are primarily used to provide objective information on the downhole geology.

As described in Appendix A.2, the electric logs respond primarily to variations in the formation porosity and the resistivity of the contained fluid. Formation waters are generally conducting; hydrocarbons are essentially nonconducting. Shales, particularly those containing brackish formation water, show characteristically low values of resistivity, whilst sandstones and limestones produce higher values, the magnitudes depending primarily on the degree of water saturation (as opposed to hydrocarbon saturation) and the salinity of the pore fluids.

Natural gamma logs, in contrast, respond to natural gamma radiation emitted by radioactive isotopes. ^{40}K is the most abundant natural emitter of gamma radiation. The isotope also happens to be a very common constituent of clay minerals. As a consequence, clay-rich shales generally exhibit a high gamma response when compared to "cleaner" sandstones and limestones. The ^{40}K isotope is responsible for the gamma radiation observed in the vast majority of situations. One important exception occurs in the case of organic or "bituminous" shales where extremely high gamma radiation is emitted by radioactive isotopes of uranium.

Despite its similar nomenclature, the gamma-gamma log is strictly a "density log" and responds primarily to variations in mineral content and porosity. It generally has a very low depth of investigation and can be significantly influenced by variations in borehole diameter. While this log can provide a fairly reliable measure of rock porosity, it is unable to determine the nature of the fluid within the pores, except perhaps to distinguish gases from liquids.

The resistivity, single point resistance, gamma and gamma-gamma logs shown for MDMW-1 in Figure 2.1 illustrate these general geophysical principles, and in doing so, display variations that reinforce the geologic interpretations. First, in considering the three electric logs, it is clear they correlate well with each other, with other logs and, in a more general sense, with the broadly defined geologic units. There are however, two minor exceptions: i) the single point resistance shows an unusual peak at about 255m (denoted by A in Figure 2.1) and ii) the single point resistance response is relatively subdued, failing in particular to respond positively to resistive beds in the Lucas Formation. The unexpected peak is simply an electrical interference anomaly, a frequent problem in urban and industrial areas such as Sarnia, where spurious ground currents are not unusual. The problem is exacerbated by the type of electrode arrangement used in the single point tool which makes it particularly prone to interference effects. The subdued response of the point resistance log is explained by the limited range of depth of investigation of the tool. As a result the log tends to be unduly influenced by the properties of the borehole fluid, a particular problem when the borehole fluid is highly conducting, a feature confirmed by the very low values of resistivity (<1 ohm-m) revealed by the fluid resistivity log.

The 16" and 64" normal resistivity logs are less influenced by either electrical interference or the properties of the borehole fluid. The borehole fluid does affect the 16" normal log to some extent and explains why this log generally registers lower values of apparent resistivity than the 64" normal. Fortunately, despite the high salinity of the borehole fluid, these effects are minimized by the small hole diameter which is considerably less than the 16" AM electrode spacing of the short normal tool.

For the purposes of log description and discussion, the electric logs are best examined alongside the gamma and gamma-gamma logs. Beginning at the top of the sequence, where casing interrupts the electric logs' measurement, the junction between the overburden and the uppermost Kettle Point Shale is clearly revealed by a sharp increase in density (B) and an extremely high gamma radiation response (C). The increased density is consistent with the transition from an unconsolidated surficial deposit to a highly indurated shale. However, the extremely high gamma response of the shale (>300 counts/sec through steel well casing) is more unusual and almost certainly indicates the presence of uranium precipitated by organic material. Similar organic rich shales have been recognized at many other localities throughout southern Ontario (see references by Johnson).

The organic rich shales are approximately 15m thick and occupy all but the lower 3 or 4m of the Kettle Point Shale. While it would appear from the logs that the organic rich shales comprise two units separated at D, the sharp change in the logs at this point is an artifact of the casing depth. Above D, the casing absorbs a significant amount of the gamma radiation. Below D, in open hole, the gamma response from the shales is so high that it contributes significantly to the amount of radiation detected by the gamma-gamma tool. As a result of this interference, the gamma-gamma registers an anomalously low density in the zone denoted by E.

The junction between the Kettle Point Shale and the underlying Hamilton Group appears to be demarcated by an extremely pure carbonate bed with a gamma response as low as 10 counts/sec (F). This bed has a density of 2.7 suggesting a relatively low porosity (<10%) depending on the mineral content (calcite/dolomite). Between approximately 50 and 83m below surface (F to G), the Hamilton Group is dominated by carbonates with frequent shale interruptions. The shales exhibit very low values of resistivity (<10 ohm-m) and relatively high gamma counts (>100 counts/sec) while the carbonates show a very low gamma response and significantly higher values of resistivity (up to 80 ohm-m). It is significant that although the carbonates display elevated values of resistivity, these values remain extremely low. Assuming that the porosity of these carbonates is in the range 5 to 10%, a resistivity value of the order of 50 to 100 ohm-m indicates that the pore water is highly saline with a total dissolved solids content in the range 5,000 to 20,000 mg/L. Below G, the remainder of the Hamilton Group is dominated by shales with just two, perhaps three carbonates of any significance (H), all saturated with saline pore waters.

The boundary between the Hamilton Group and underlying Dundee Formation is extremely well portrayed by the geophysical logs. It is marked by a sharp drop in the gamma response showing the return to relatively clean carbonate lithologies, and by a rapid increase in resistivity to values of the order of 300 ohm-m. Unfortunately, in the absence of an S.P. log, the salinity of the formation fluids is not known. However, if it can be assumed that the formation waters within these carbonates are as saline or more saline than the waters in the overlying Hamilton Group, then the relatively high resistivity values can be explained only by a relatively low percentage water saturation with the remaining pore space being occupied with hydrocarbons. Such an interpretation would appear to be consistent with traces of oil observed on the borehole cores. Significantly, whereas the 16" and 64" normal logs showed similar values of resistivity for the carbonates in the Hamilton Group, values of 16" normal resistivity tend to be significantly lower than the 64" normal resistivity values in these deeper formations. This difference to the due to the invasion of drilling fluids into the carbonates, displacing the more resistive hydrocarbons laterally. The 16" normal resistivity log with its limited range of depth measurement tends to provide a measure of resistivity of the invaded zone where it is present, while the 64" normal log is able to provide a better quantitative assessment of the resistivity beyond the invaded zone.

From the top of the Dundee Formation at about 143m to a point J, mid-way through the Lucas Formation at a depth of about 240m, the carbonate sequence retains its clay free character and displays a gamma response consistently in the range 5 to 20 counts/sec. Variations in resistivity are difficult to interpret without a detailed knowledge of mineral character, porosity and formation water salinity. However, for the most part, the broader variations most likely reflect relative changes in water and hydrocarbon content. Clearly, the resistivity data have only limited interpretive use in this depth range. However, an important change in the gamma-gamma (density) response at a depth of 185m (K), broadly at the postulated transition between the Dundee and underlying Lucas Formation, does provide valuable additional information. As shown by the log the character of the gamma-gamma response changes radically. Above K, it indicates a relatively consistent density of 2.5 g/cc; below K to the base of the Lucas Formation the density becomes highly variable and ranges between 2 and 3 g/cc, averaging close to 2.4 g/cc. To some extent the variations may indicate the presence of evaporite beds. Gypsum and halite display characteristically low values of density (2.32 and 2.165 g/cc respectively), while anhydrites have an unusually high density of 2.96 g/cc. Certainly anhydrite beds must be responsible for the high density peaks at L. However, the numerous low density peaks and the broad low density zones between K and K' and at M probably reflect large increases in porosity, either due to fracturing or to increased dolomite vugginess. It is significant that the low density zones appear to correlate with zones identified by INTERA (data not presented here) as having a relatively high permeability.

There are few lithological changes of significance towards the bottom of the hole. Below J a slight increase in the clay content of the carbonate is indicated by a marginal increase in gamma response. The relatively low resistivity values are indicative of saline formation waters and high water saturation percentages. Also, with the exception of zone M described above, the gamma-gamma (density) response becomes more regular, indicating densities within the range 2.4 to 2.6 g/cc.

2.2 Caliper Logs

The caliper log run in MDMW-1 was extremely fine tuned to respond to borehole diameter variations as small as 1mm. Under these circumstances it can be seen that the greater part of the hole is extremely smooth walled. With the exception of the Hamilton Group where small but significant changes occur, caliper deflections throughout the remainder of the hole are limited to isolated displacements of less than 2 to 3mm (arrowed). Even within the Hamilton Group, changes in borehole diameter are not as great as they may first appear. Maximum borehole diameters in this zone are 150mm (6"), representing an increase of approximately 50mm (2") relative to initial borehole diameter. Most of the broader increases in borehole diameter are probably associated with drilling operations. The origin of the sharper deflections is more speculative, however, and while drilling effects may play a role, it is suspected that the deflections are indicative of pervasive fractures. It is significant, for example, that the displacements at N are correlative with sharp gamma-gamma deflections (N'), suggesting that the features are extensive enough to cause substantial changes in local rock density. These density changes may be the result of i) large increases in porosity, and/or ii) the presence of low density gases in the rock pore space. It should be noted that the low density deflections do not appear to correlate with carbonate units, and are developed solely within the shale.

2.3 Fluid Logs

The fluid logs include temperature, differential temperature and fluid resistivity. Ideally these logs should either be run i) following a long period of rest during which time the borehole fluid can achieve equilibrium with its surroundings or ii) following a controlled episode of pumping which draws water from fracture zones thus creating anomalies in the temperature and fluid resistivity profiles that allow their ready recognition. Although neither of these ideals was even remotely met, the fluid logs shown in Figure 2.1 do merit careful attention.

The most significant feature of the fluid logs is the highly disturbed temperature profile. This disturbance is shown most prominently by the differential temperature log which displays a highly fluctuating response throughout the length of the borehole. Interpretation of the temperature logs is seriously complicated by the hydraulic disequilibrium that resulted from the well drilling and from the flushing of the borehole. Nevertheless there are several levels at which major changes in log characteristics occur and these likely indicate the movement of fluid into or out of the well. In this regard, important indicators of flow are i) in the vicinity of P at a depth of about 190m where the differential temperature log is highly agitated and locally deflects off scale; ii) at Q and R where sharp differential temperature deflections are recorded, and iii) at S, T and U where the differential temperature logs undergo significant changes in trend. In the vicinity of U, the log actually shows cooling with depth over a distance of several metres. Perhaps significantly, several of the features (for example, P,T,R and U) are coincident with zones or horizons of relatively low density (higher porosity).

The fluid resistivity log is the last of the fluid logs presented here. It is used to determine the salinity of the water contained within the borehole column. This water may or may not be representative of water within the formation adjacent to the borehole. As shown by Figure 2.1 the fluid resistivity is extremely low throughout the borehole, varying between 0 and 0.3 ohm-m. This is equivalent to a total dissolved solids concentration in excess of 20,000 mg/L. Unlike the temperature log which is highly disturbed by flow conditions within the hole, the fluid resistivity log remains remarkably steady. Some oscillation occurs towards the top of the hole which is believed to be caused by gases bubbling up through the device and interrupting the flow of electrical current. This disturbance (or "noise") is not present below V.

3. SHALLOW BOREHOLES

3.1 Range of Logs.

Five of the six boreholes logged were drilled to intercept the top of the bedrock. As indicated in Table 1.1, only five logs were run in these holes, four electric logs and a natural gamma log. A gamma-gamma log was not attempted in the holes due to the risk of borehole collapse and the consequent potential loss of a radioactive source. The fluid logs (fluid resistance, temperature and differential temperature) were not run as the boreholes were newly drilled and contained drilling mud which was totally unrepresentative of formation conditions.

3.2 Log Description/Interpretation

The logs from the shallow boreholes are shown in Figures 3.1 to 3.5 for boreholes OW1-87, OW2-87, OW5-87, OW14-87 and OW12-87 respectively. All depths are shown in metres with respect to ground level. With the exception of borehole OW12-87 which was 73m deep, all the shallow boreholes are very shallow and range between 34m and 47m in depth.

In general, the logs are relatively featureless, a characteristic that suggests very little variation in the nature of the materials. Logs from the four "40m" wells show virtually identical results. There is a general increase in gamma ray response from about 50/100 counts/sec near the surface to about 200 counts/sec at about 15 or 20 m in wells OW1-87 and OW2-87, and at 5 or 10m in wells OW6-87 and OW14-87. This change indicates a gradual increase in the clay to sand ratio of the sediments. The response of about 200 counts/sec recorded throughout the greater depth of the wells is indicative of clays with little or no sand/silt content. Resistivity values of approximately 50 ohm-m are consistent with this interpretation. There is no evidence of coarse grained material in any of the holes. The S.P logs are less easily interpreted. Here, the problem appears to be caused by the inconsistent chemical quality of the borehole mud, a problem that may have been caused when the the well intercepted bedrock and the muds were diluted with formation waters. Under normal conditions, S.P. logs tend to form mirror images with the resistivity/resistance logs. This type of response is demonstrated by the logs from OW6-87 shown in Figure 3.3. S.P logs and resistivity logs from well OW1-87, in Figure 3.1, however, are virtually identical. This suggests that the S.P. response has been reversed, a problem which can occur when the borehole mud is more saline than the formation water. Given these difficulties, the S.P logs must be interpreted with considerable caution.

Logs from the slightly deeper hole (OW12-87) in Figure 3.5 are generally similar to the "40m" wells, down to a depth of about 35/40m. Below this depth there is a gradual decrease in gamma ray response accompanied by an increase in resistivity. This transition occurs over a depth interval of 10m and is indicative of a slightly decreasing clay content. Below a depth of approximately 48m, the logs stabilize and remain unchanged to the bottom of the hole.

In summary, logs from the five shallow wells reveal little variation in the lithological character of the overburden sediments. These sediments are predominantly clays, although some coarser material (silts and sands) do appear towards the top of the sequence. There is no evidence to suggest the existence of significant sand and/or gravel units anywhere in the succession.

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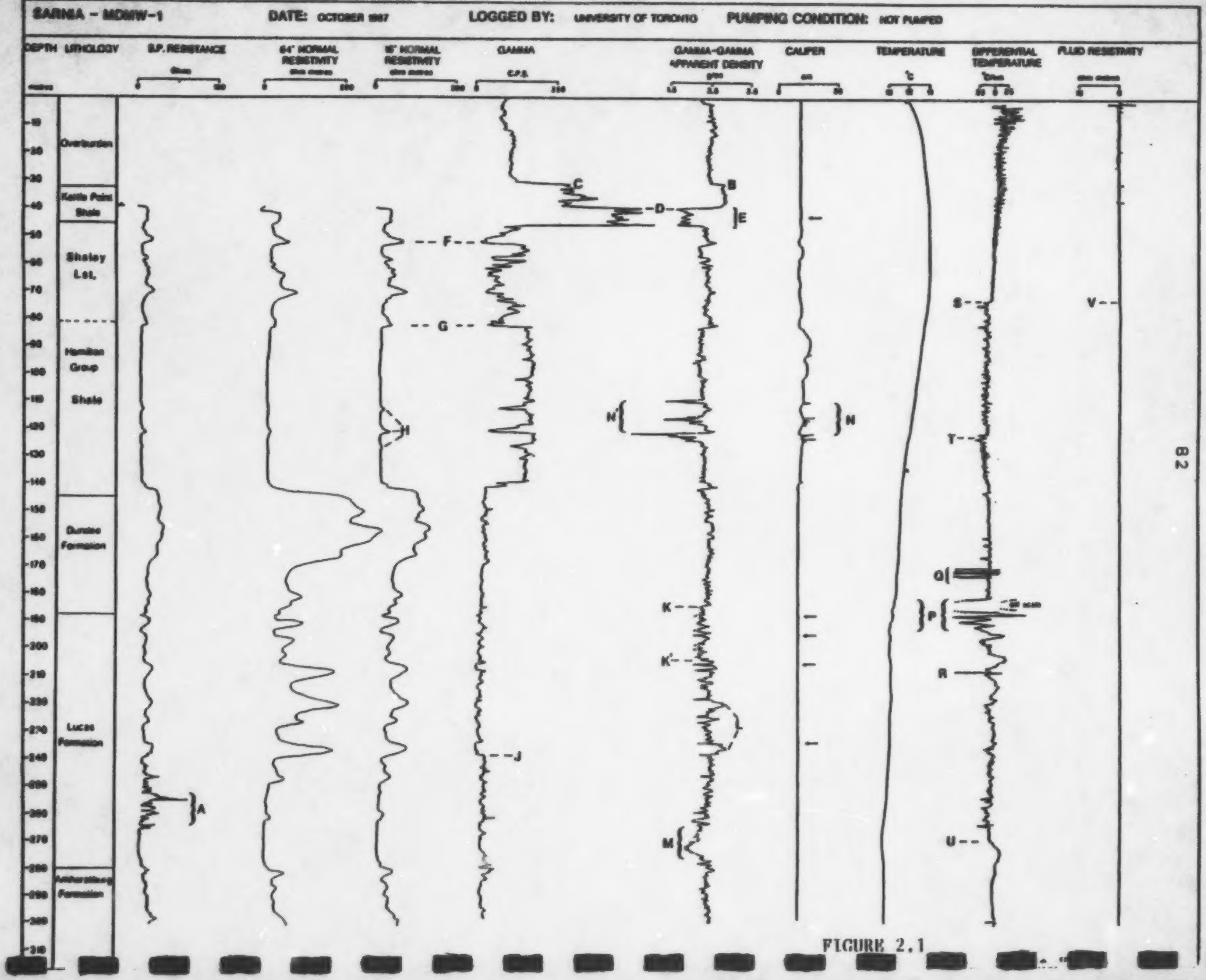

SARNIA - MDMW-1
DATE: OCTOBER 1987
LOGGED BY: UNIVERSITY OF TORONTO
PUMPING CONDITION: NOT PUMPED
DEPTH
metres
LITHOLOGY
S.P. RESISTANCE
Ohm
0
100
64" NORMAL RESISTIVITY
ohm metres
0
200
16" NORMAL RESISTIVITY
ohm metres
0
200
GAMMA
C.P.S.
0
200
GAMMA-GAMMA APPARENT DENSITY
g/cc
1.5
2.0
2.5
CALIPER
cm
0
30
TEMPERATURE
°C
DIFFERENTIAL TEMPERATURE
°C/m
FLUID RESISTIVITY
ohm metres
Overburden
Kettle Point Shale
Shaley Lst.
Hamilton Group Shale
Dundee Formation
Lucas Formation
Amherstburg Formation
A
B
C
D
E
F
G
H
J
K
K'
M
N
N'
Q
P
R
S
T
U
V

FIGURE 2.1

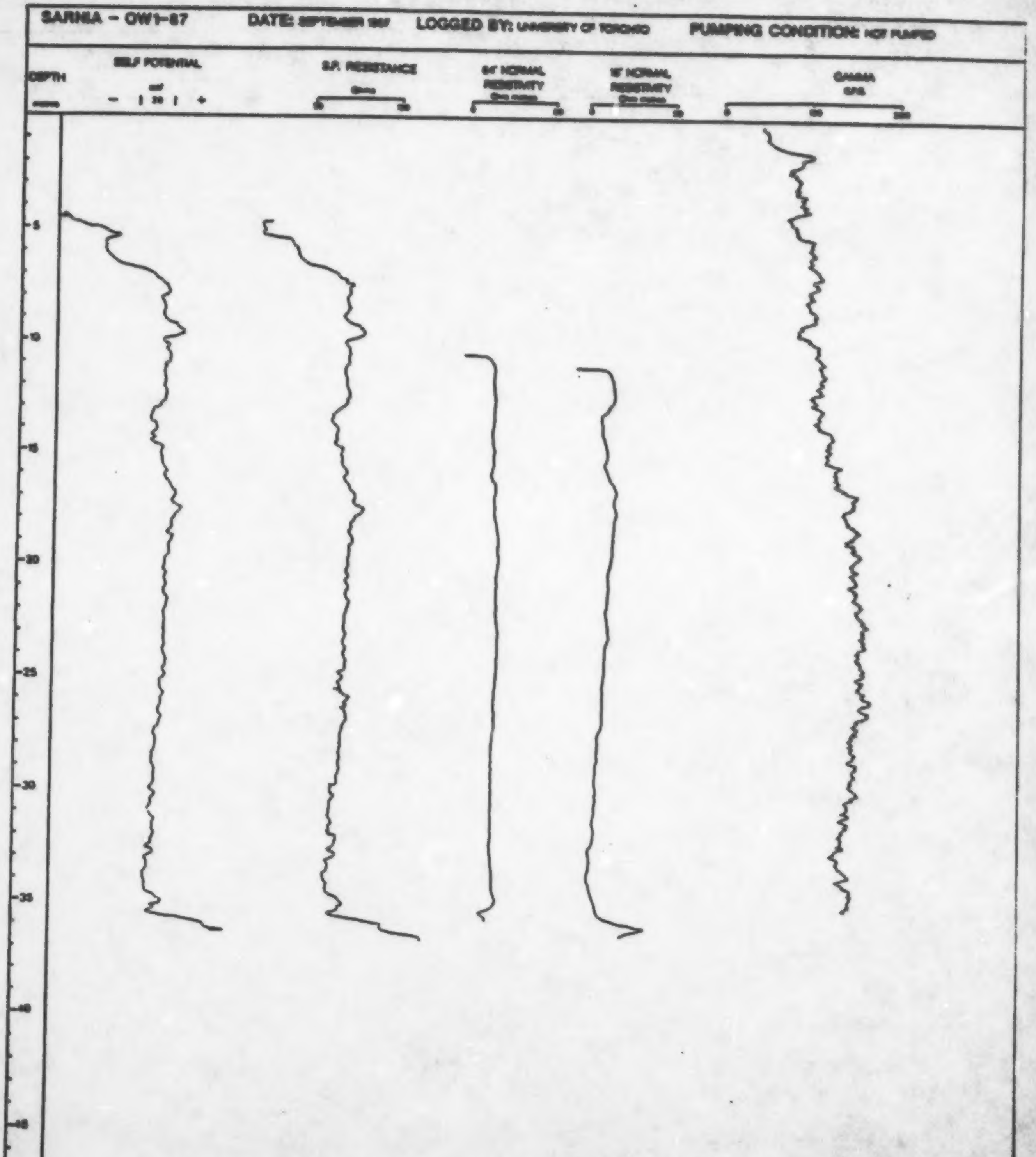

SARNIA - OW1-87
DATE:
LOGGED BY:
PUMPING CONDITION:
DEPTH
SELF POTENTIAL
- +
S.P. RESISTANCE
64" NORMAL RESISTIVITY
16" NORMAL RESISTIVITY
GAMMA
5
10
15
20
25
30
35
40
45

FIGURE 3.1

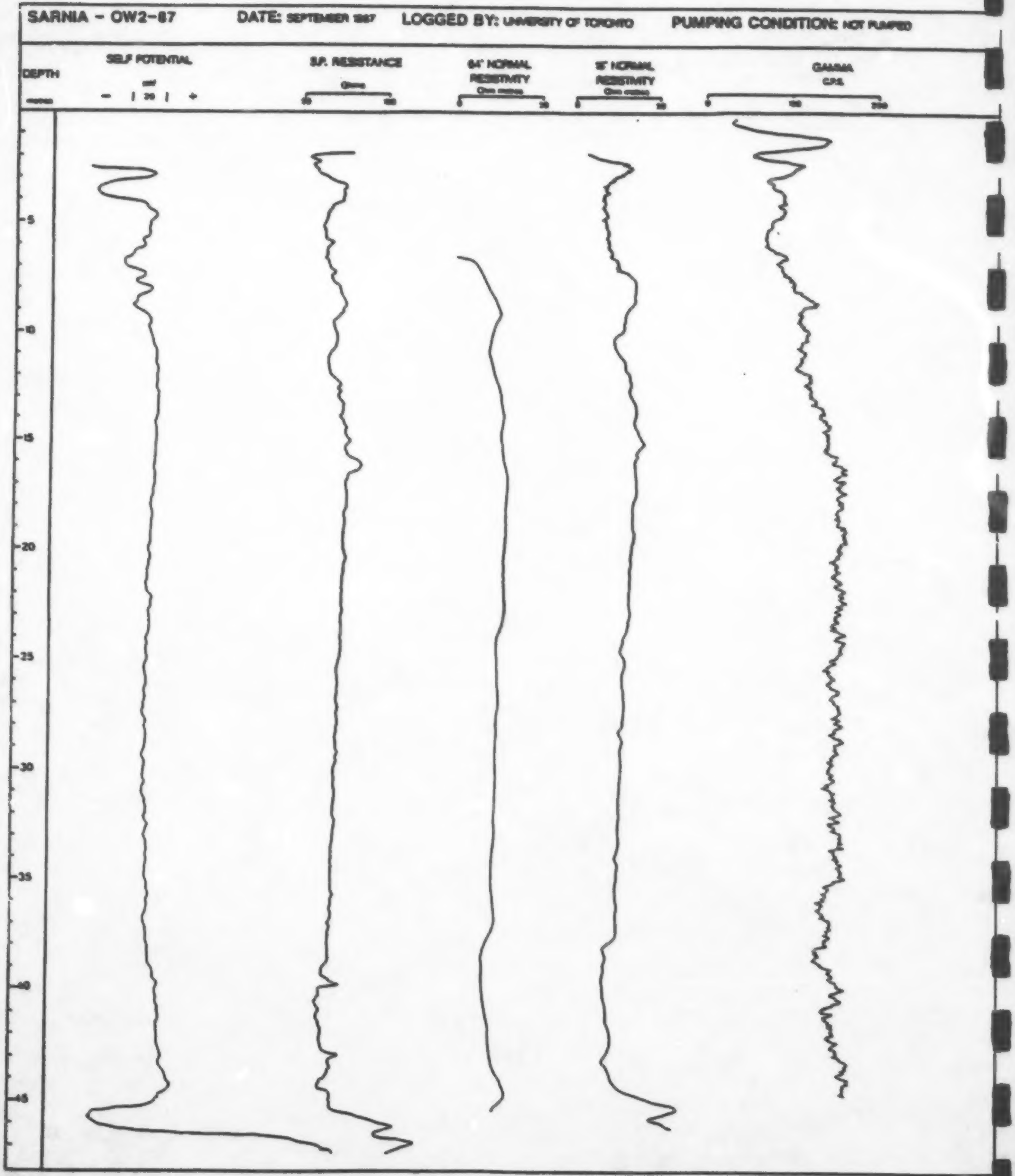

SARNIA - OW2-87
DATE: SEPTEMBER 1987
LOGGED BY: UNIVERSITY OF TORONTO
PUMPING CONDITION: NOT PUMPED
DEPTH
metres
SELF POTENTIAL
mV
- | 20 | +
S.P. RESISTANCE
Ohms
50
100
64" NORMAL RESISTIVITY
Ohm metres
0
20
16" NORMAL RESISTIVITY
Ohm metres
0
20
GAMMA
C.P.S.
0
100
200
5
10
15
20
25
30
35
40
45

FIGURE 3.2

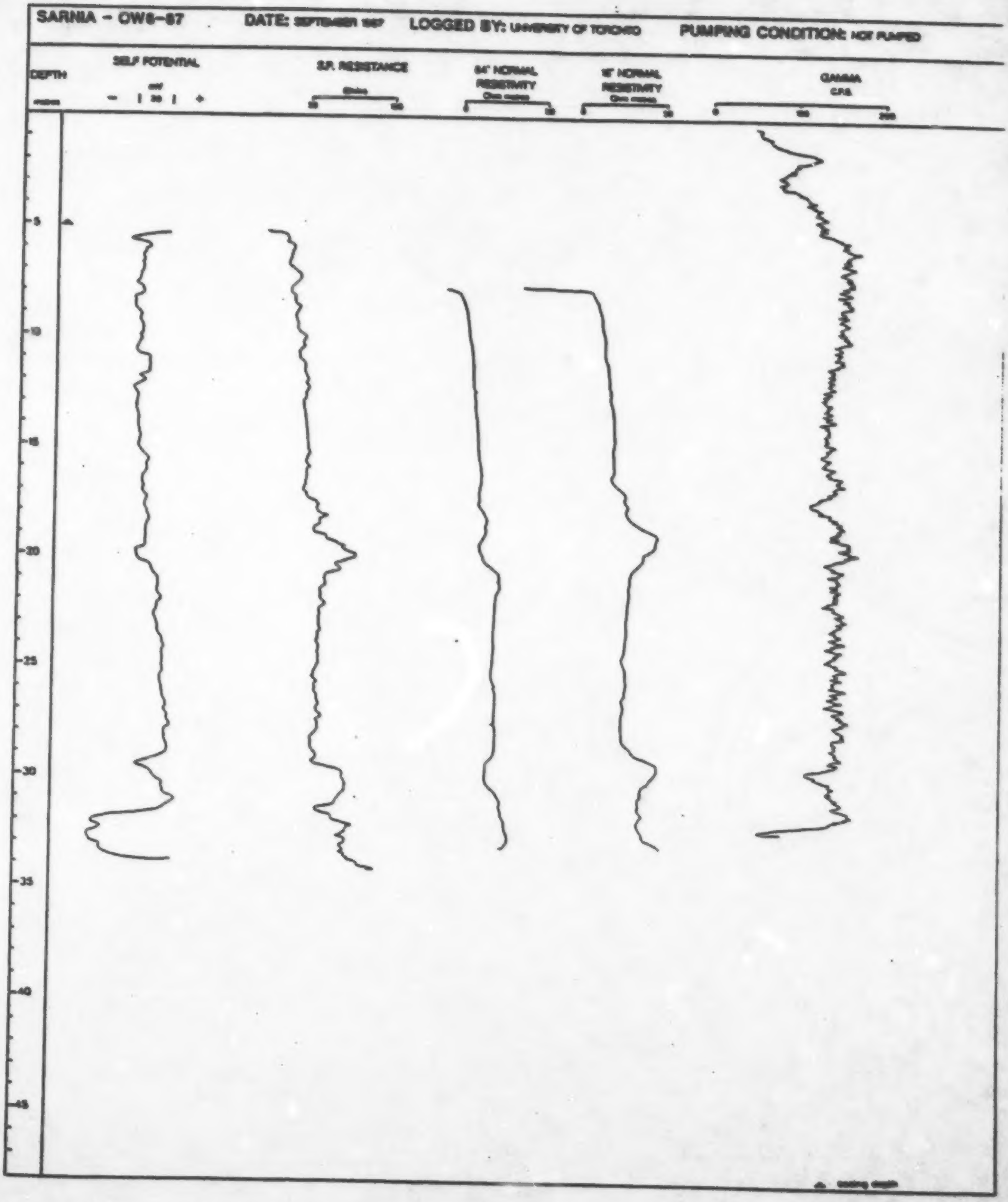

SARNIA - OW6-87
DATE: SEPTEMBER 1987
LOGGED BY: UNIVERSITY OF TORONTO
PUMPING CONDITION: NOT PUMPED
DEPTH
metres
SELF POTENTIAL
mV
- | 20 | +
S.P. RESISTANCE
Ohms
20
100
64" NORMAL RESISTIVITY
Ohm metres
0
30
16" NORMAL RESISTIVITY
Ohm metres
0
30
GAMMA
C.P.S.
0
100
200
5
10
15
20
25
30
35
40
45
casing depth

FIGURE 3.3

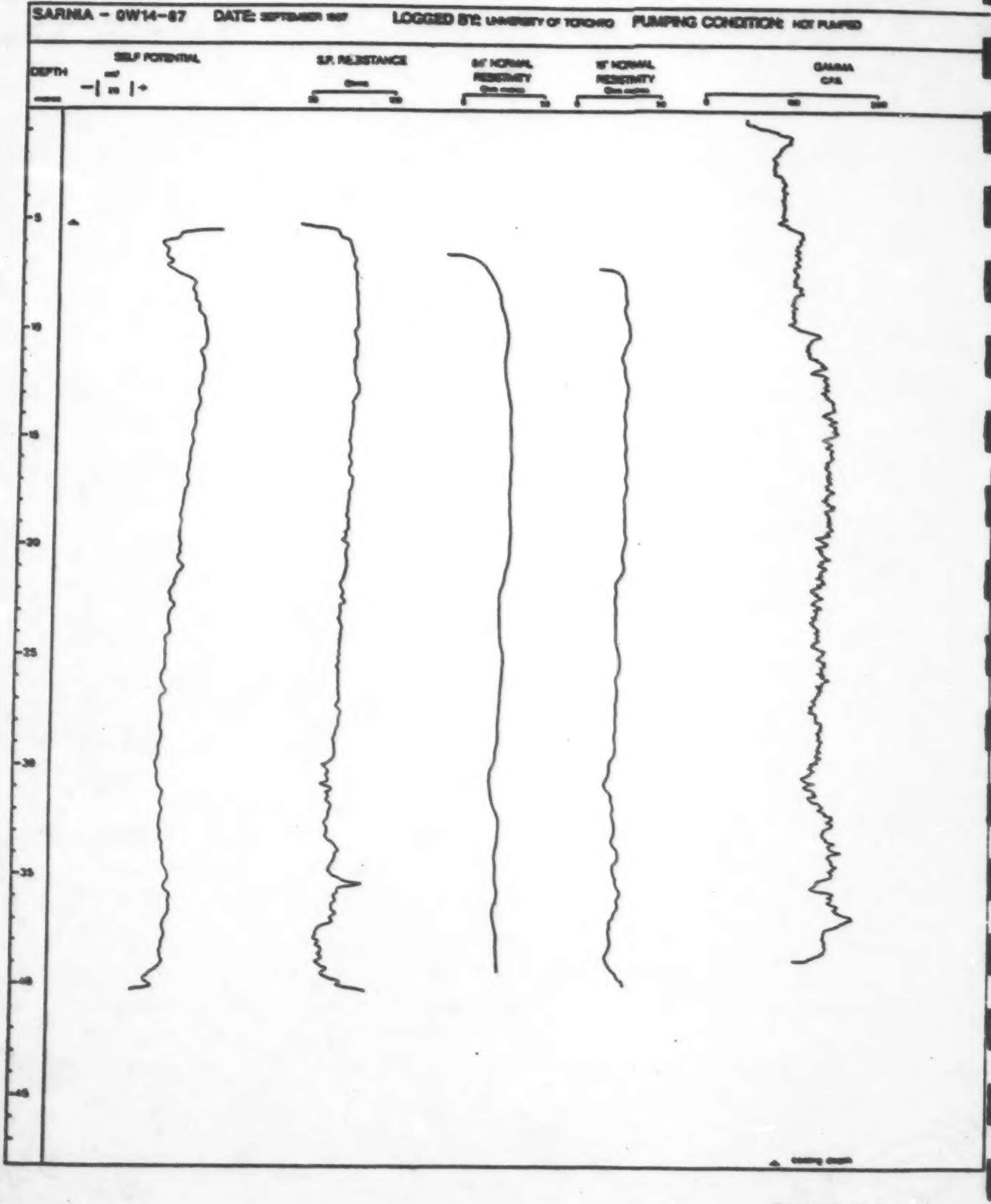

SARNIA - OW14-87
DATE: SEPTEMBER 1987
LOGGED BY: UNIVERSITY OF TORONTO
PUMPING CONDITION: NOT PUMPED
DEPTH
metres
SELF POTENTIAL
mV
— 20 +
S.P. RESISTANCE
Ohms
64" NORMAL RESISTIVITY
Ohm-metres
0
10
16" NORMAL RESISTIVITY
Ohm-metres
0
30
GAMMA
CPS
0
100
200
5
10
15
20
25
30
35
40
45
casing depth

FIGURE 3.4

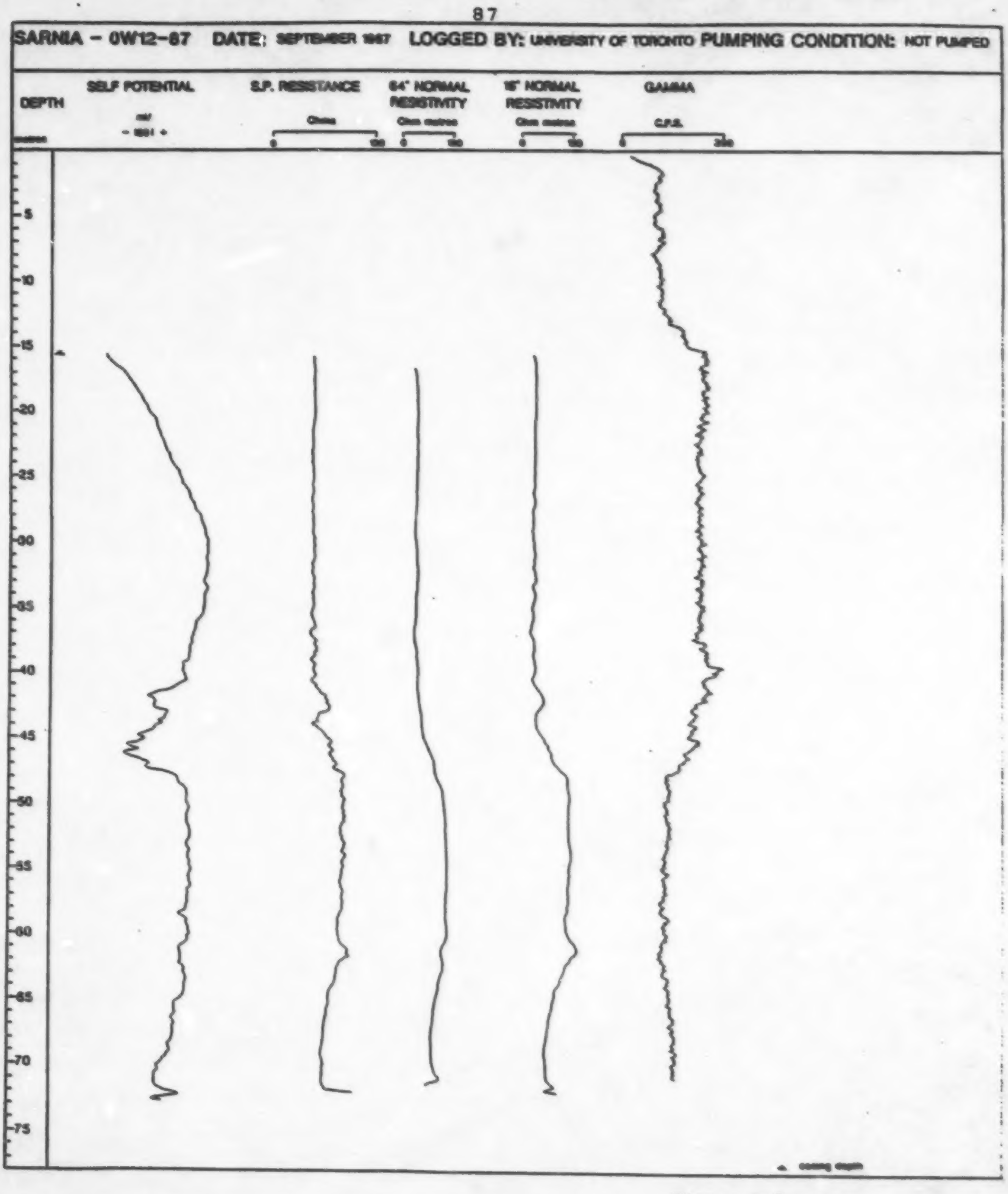

SARNIA - OW12-87 DATE: SEPTEMBER 1987 LOGGED BY: UNIVERSITY OF TORONTO PUMPING CONDITION: NOT PUMPED
DEPTH
metres
SELF POTENTIAL
mV
S.P. RESISTANCE
Ohms
0
100
64" NORMAL RESISTIVITY
Ohm metres
0
100
16" NORMAL RESISTIVITY
Ohm metres
0
100
GAMMA
C.P.S.
0
200
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
casing depth

Figure 3.5

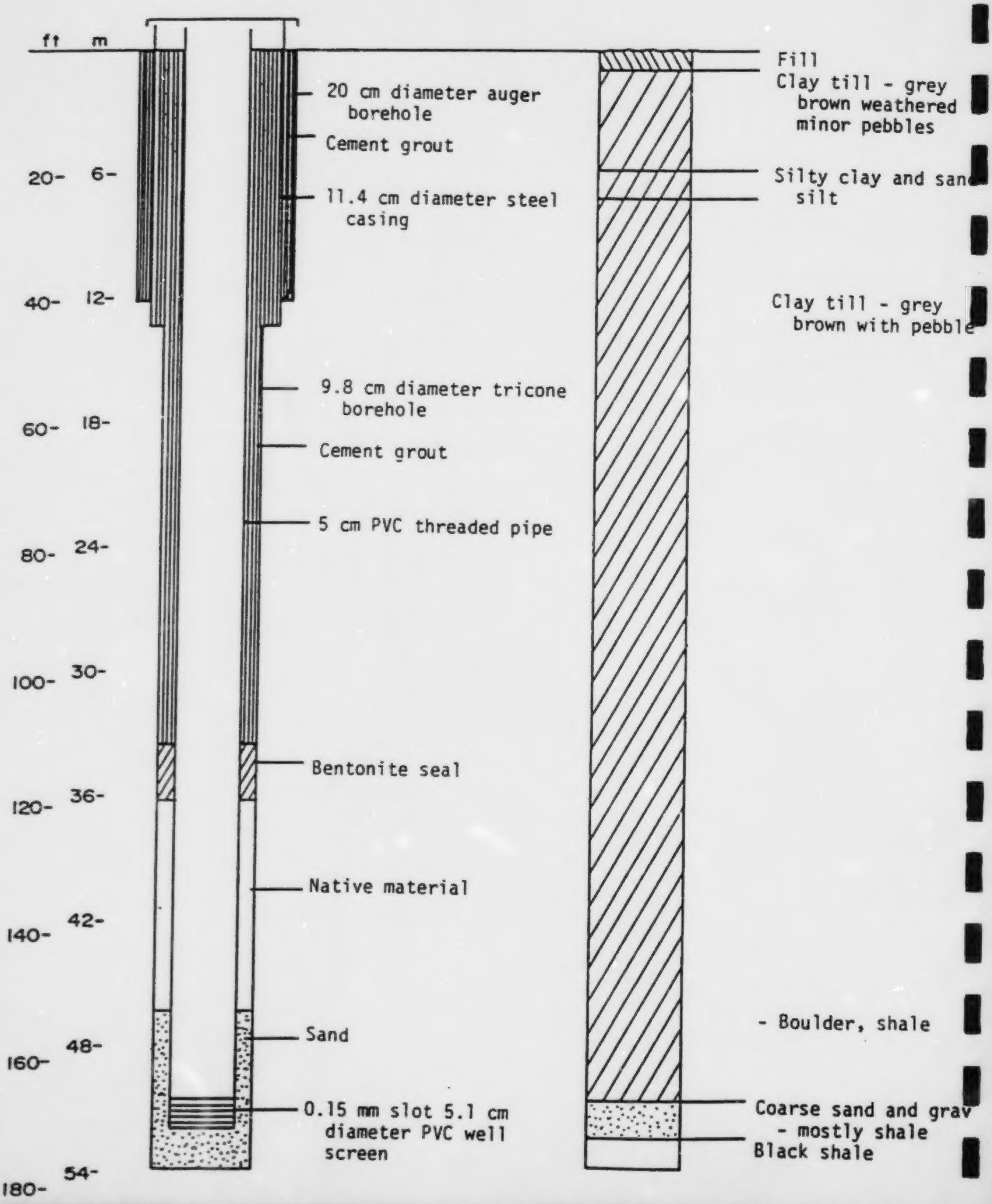
APPENDIX D

Stratigraphic and Instrumentation Logs
1985, 1986 and 1987 Monitoring Well Series

APPENDIX D1

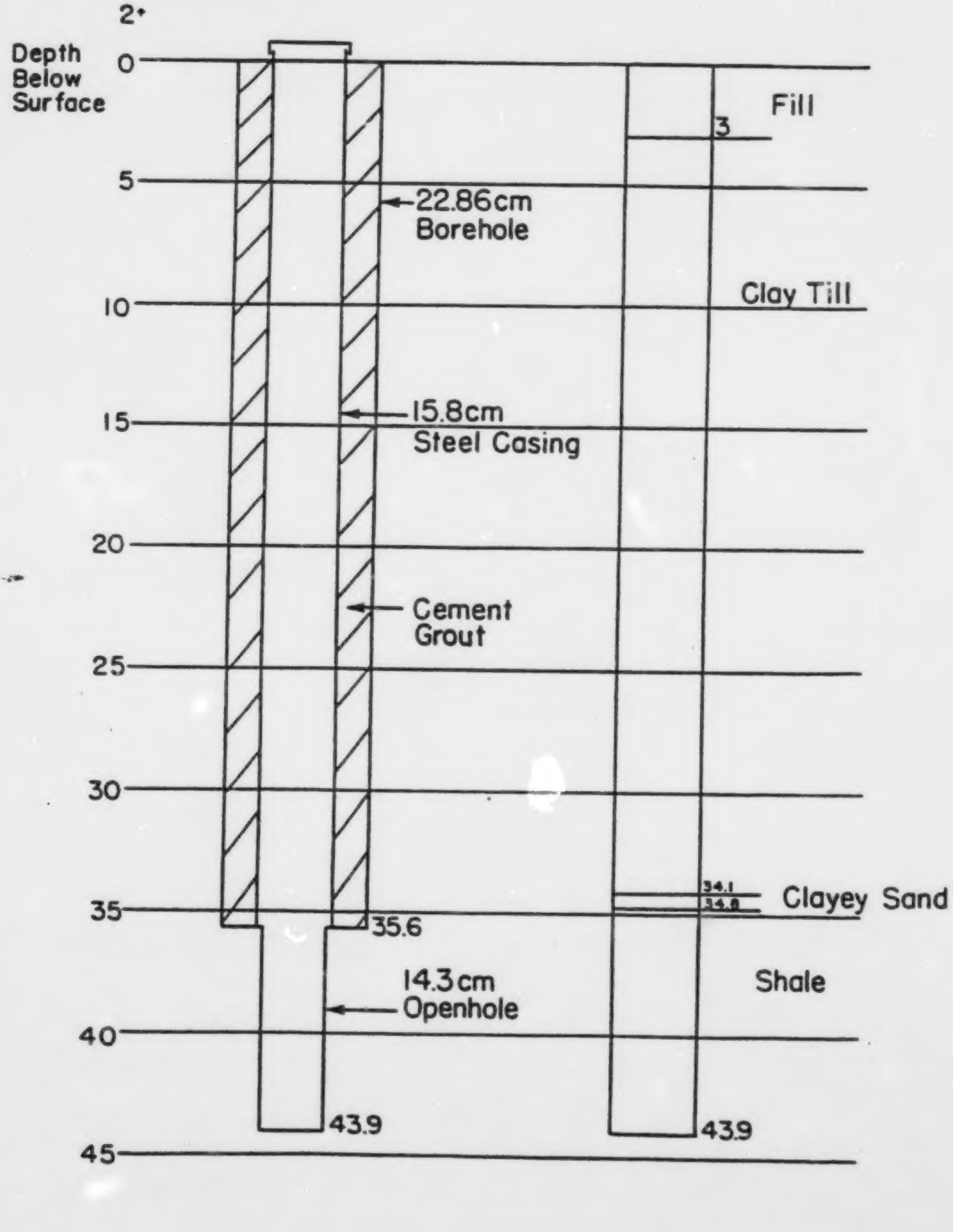
Stratigraphic and Instrumentation Logs
1985 Monitoring Well Series
(Reproduced from GTC 1985 and INTERA, 1986)

ESSO MONITORING WELL 1-85


ft
m
20-
6-
40-
12-
60-
18-
80-
24-
100-
30-
120-
36-
140-
42-
160-
48-
180-
54-
20 cm diameter auger borehole
Cement grout
11.4 cm diameter steel casing
9.8 cm diameter tricone borehole
Cement grout
5 cm PVC threaded pipe
Bentonite seal
Native material
Sand
0.15 mm slot 5.1 cm diameter PVC well screen
Fill
Clay till - grey brown weathered minor pebbles
Silty clay and san silt
Clay till - grey brown with pebble
- Boulder, shale
Coarse sand and grav - mostly shale
Black shale

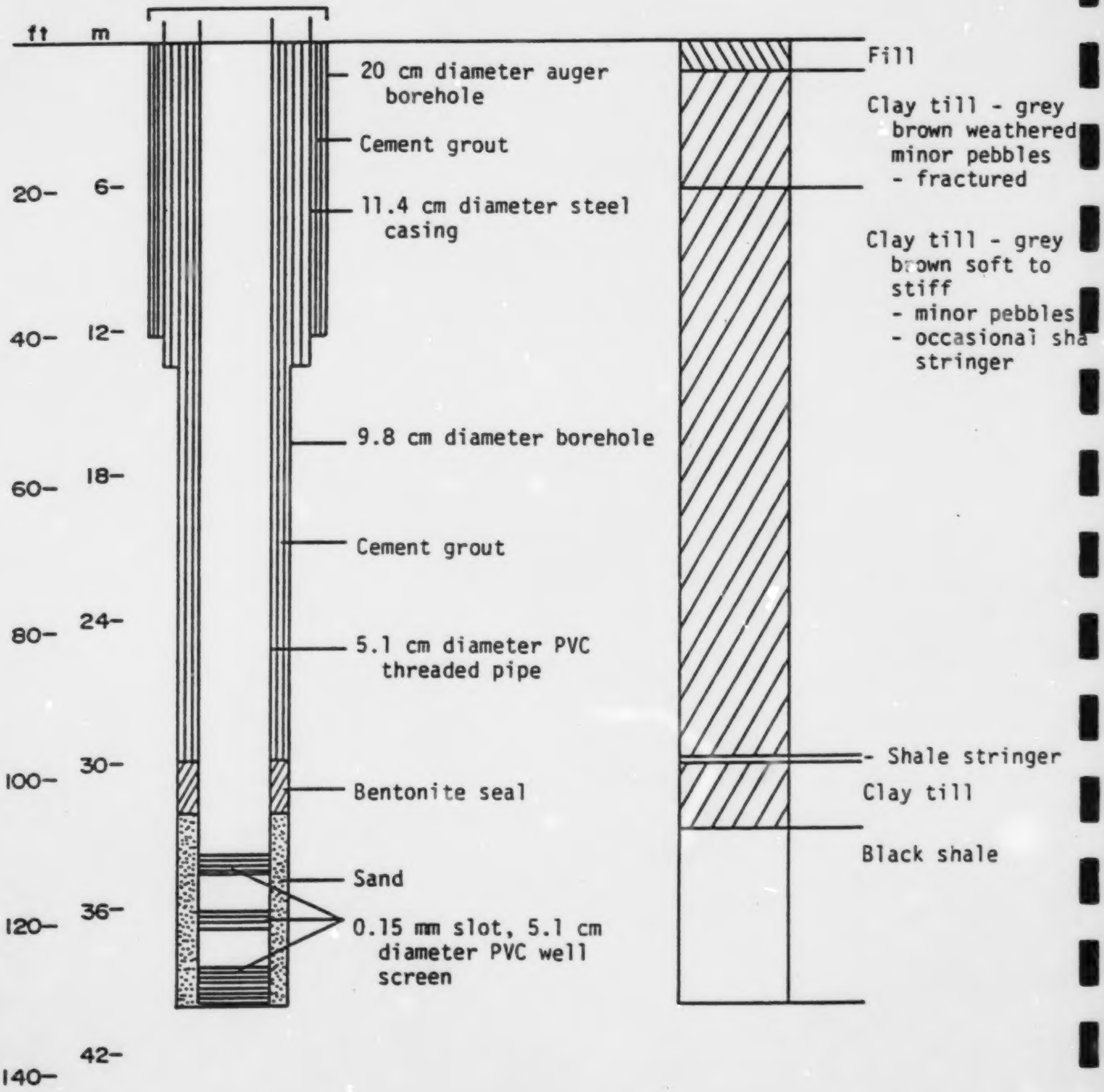
2-85

Mitton Street Well


2+
Depth Below Surface
0
5
10
15
20
25
30
35
40
45
Fill
3
22.86cm Borehole
Clay Till
15.8cm Steel Casing
Cement Grout
34.1
34.8
Clayey Sand
35.6
14.3cm Openhole
Shale
43.9
43.9

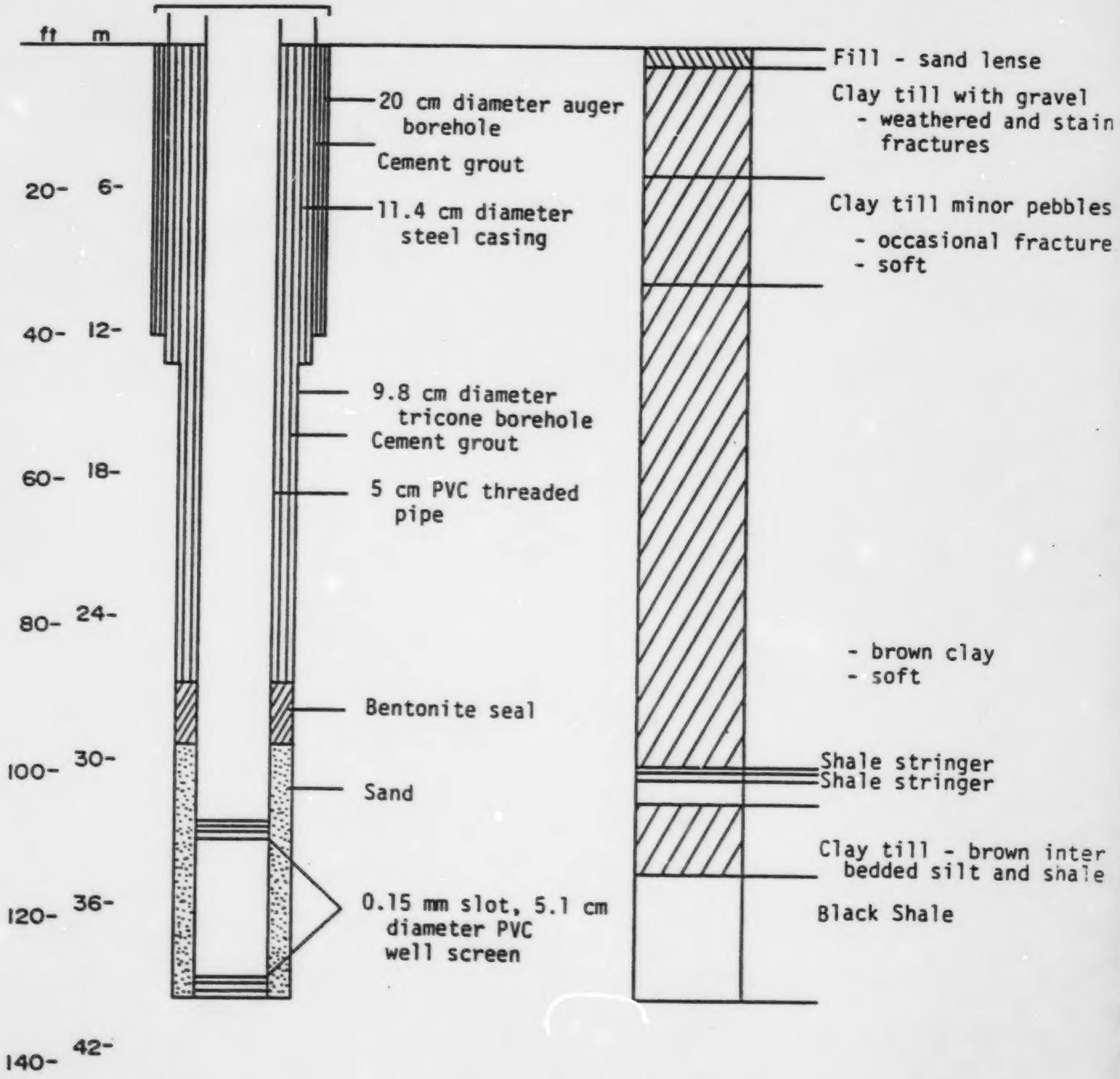
MOE - I MONITORING WELL

3-85


ft
m
20-
6-
40-
12-
60-
18-
80-
24-
100-
30-
120-
36-
140-
42-
20 cm diameter auger borehole
Cement grout
11.4 cm diameter steel casing
9.8 cm diameter borehole
Cement grout
5.1 cm diameter PVC threaded pipe
Bentonite seal
Sand
0.15 mm slot, 5.1 cm diameter PVC well screen
Fill
Clay till - grey brown weathered minor pebbles - fractured
Clay till - grey brown soft to stiff
- minor pebbles
- occasional sha stringer
- Shale stringer
Clay till
Black shale

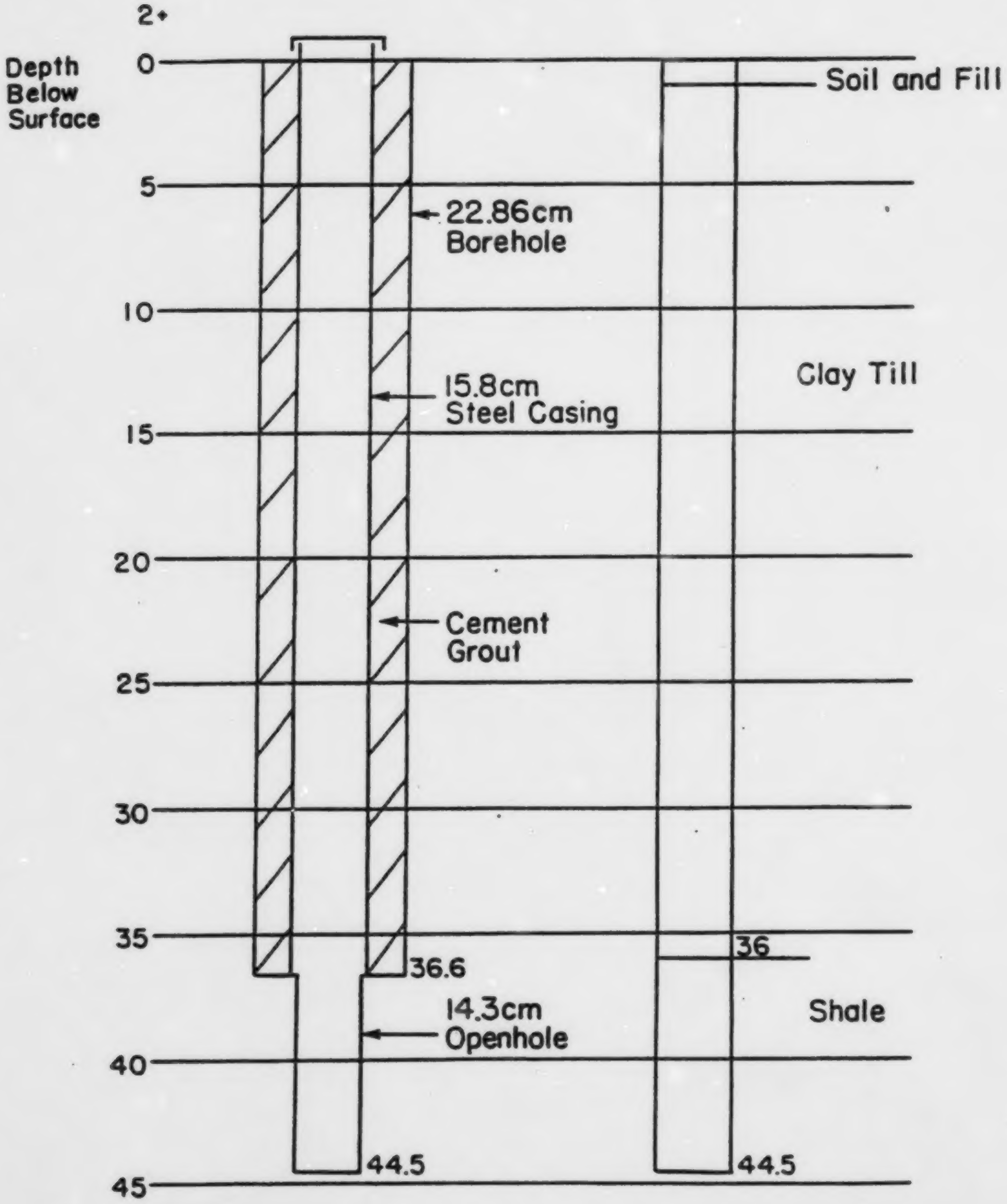
DOW MONITORING WELL

4-85


ft m
20- 6-
40- 12-
60- 18-
80- 24-
100- 30-
120- 36-
140- 42-
20 cm diameter auger borehole
Cement grout
11.4 cm diameter steel casing
9.8 cm diameter tricone borehole
Cement grout
5 cm PVC threaded pipe
Bentonite seal
Sand
0.15 mm slot, 5.1 cm diameter PVC well screen
Fill - sand lense
Clay till with gravel
- weathered and stain fractures
Clay till minor pebbles
- occasional fracture
- soft
- brown clay
- soft
Shale stringer
Shale stringer
Clay till - brown inter bedded silt and shale
Black Shale

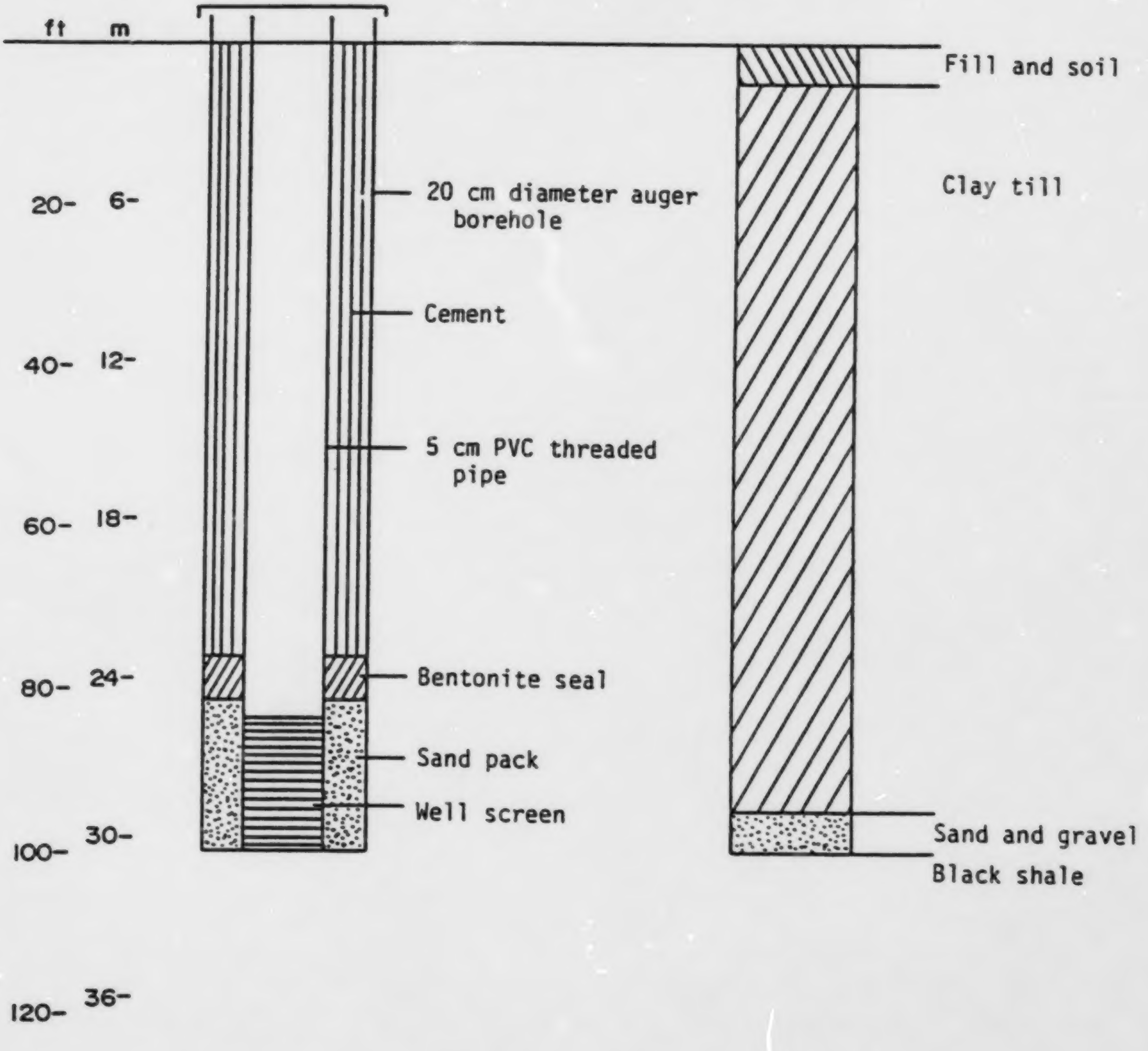
5-85

Sarnia Indian Reserve Well


2+
Depth Below Surface
0
5
10
15
20
25
30
35
40
45
Soil and Fill
22.86cm Borehole
Clay Till
15.8cm Steel Casing
Cement Grout
36.6
36
14.3cm Openhole
Shale
44.5
44.5

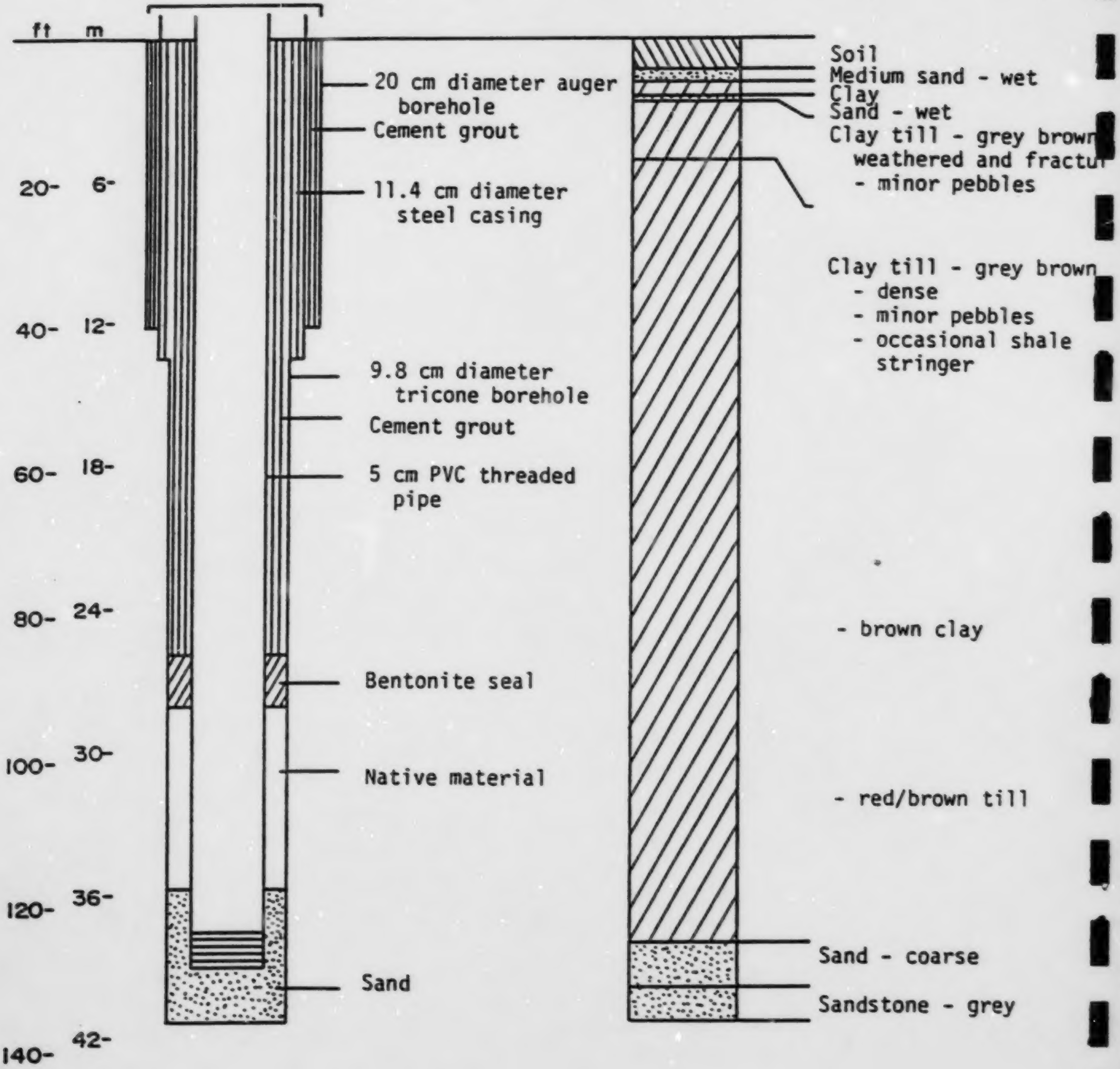
MOE – 2 MONITORING WELL

6-85


ft m
20- 6-
40- 12-
60- 18-
80- 24-
100- 30-
120- 36-
20 cm diameter auger borehole
Cement
5 cm PVC threaded pipe
Bentonite seal
Sand pack
Well screen
Fill and soil
Clay till
Sand and gravel
Black shale

CIL MONITORING WELL

7-85


ft
m
20-
6-
40-
12-
60-
18-
80-
24-
100-
30-
120-
36-
140-
42-
20 cm diameter auger borehole
Cement grout
11.4 cm diameter steel casing
9.8 cm diameter tricone borehole
Cement grout
5 cm PVC threaded pipe
Bentonite seal
Native material
Sand
Soil
Medium sand - wet
Clay
Sand - wet
Clay till - grey brow
weathered and fractu
- minor pebbles
Clay till - grey brown
- dense
- minor pebbles
- occasional shale stringer
- brown clay
- red/brown till
Sand - coarse
Sandstone - grey

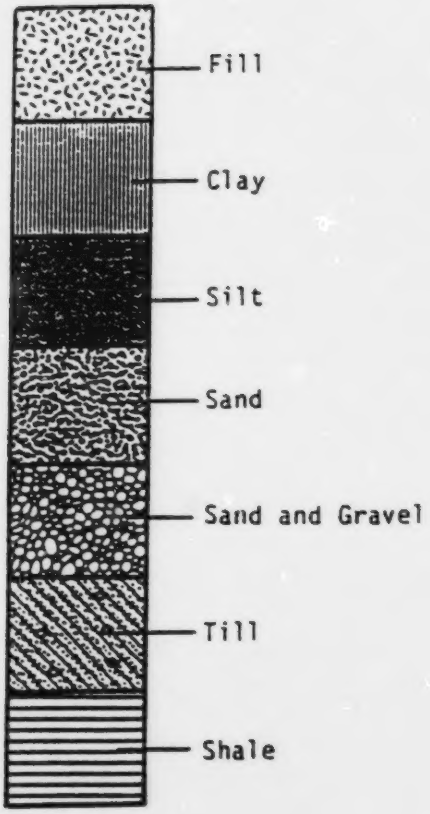
APPENDIX D2

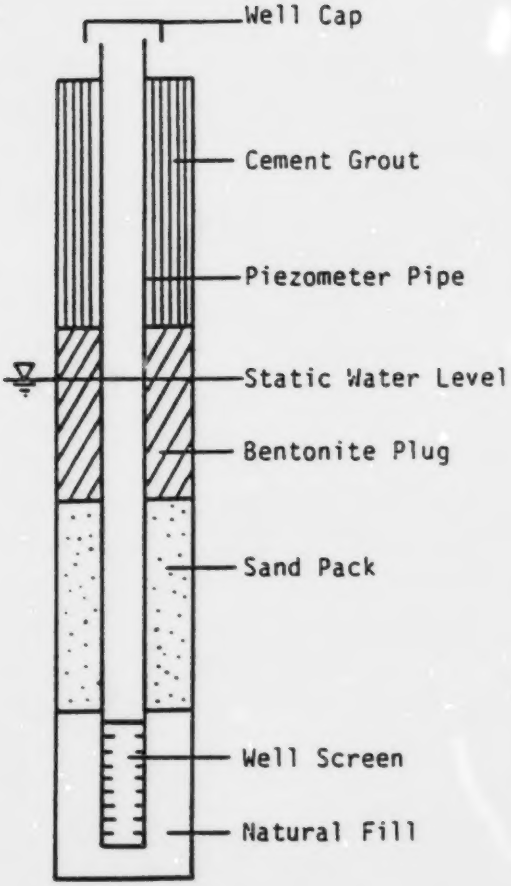
Stratigraphic and Instrumentation Logs
1986 Monitoring Well Series
(Reproduced from INTERA, 1987)

Legend

1986

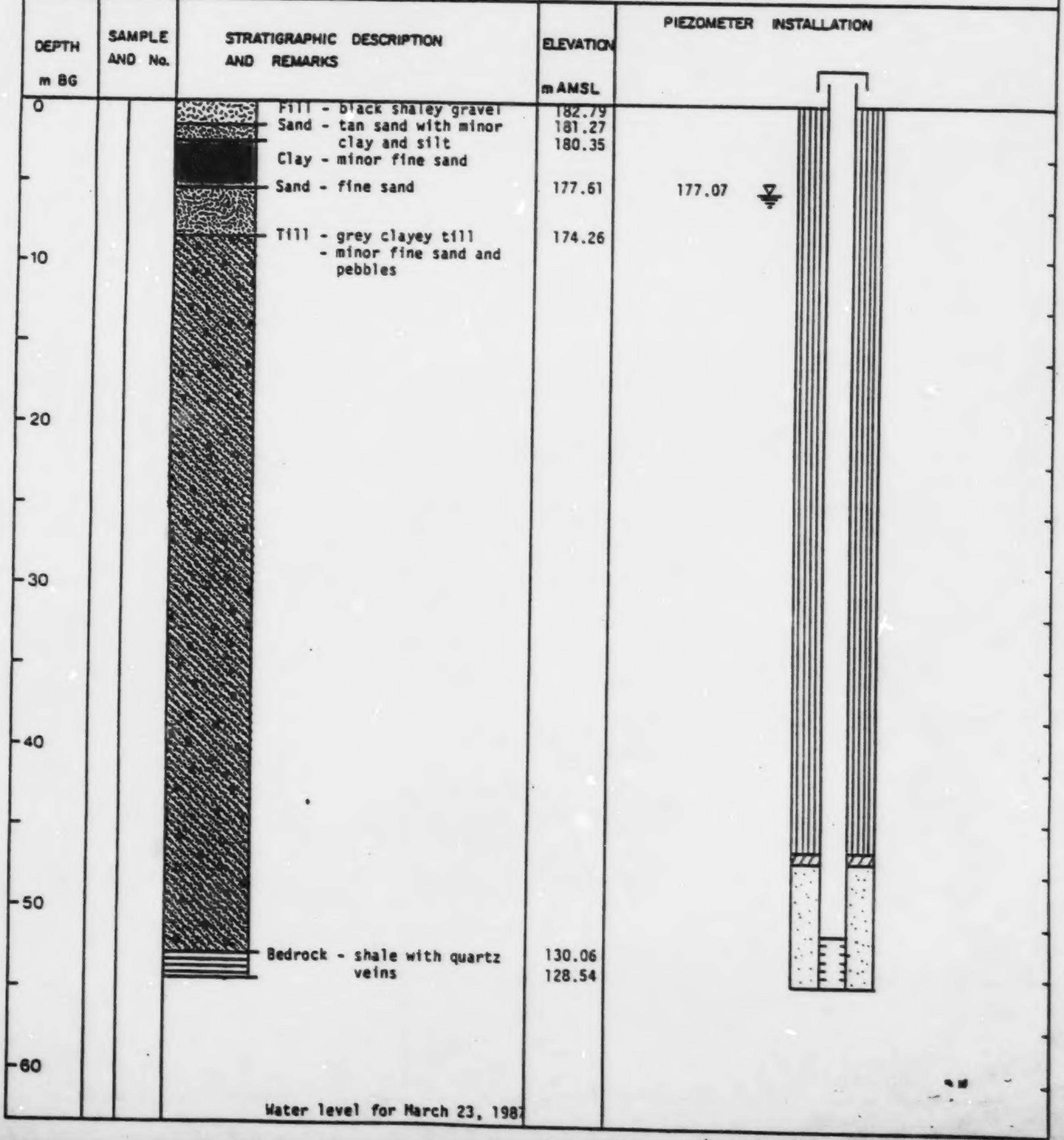
Stratigraphic & Instrumentation Logs


Fill
Clay
Silt
Sand
Sand and Gravel
Till
Shale


Well Cap
Cement Grout
Piezometer Pipe
Static Water Level
Bentonite Plug
Sand Pack
Well Screen
Natural Fill

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: EC/SARNIA, H87-019	BOREHOLE No.: Prince of Wales Park Deep Well (#1) 1-86
CLIENT: Environment Canada	DATE COMPLETED: November 20, 1986
LOCATION: Sarnia	DRILLING METHOD: Mud Rotary (5 1/8 in.)
REFERENCE ELEVATION: 182.785 m AMSL	DRILL SUPERVISOR: Andy Backus

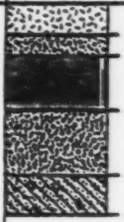

DEPTH m BG
SAMPLE AND No.
PIEZOMETER INSTALLATION
0
10
20
30
40
50
60
177.07

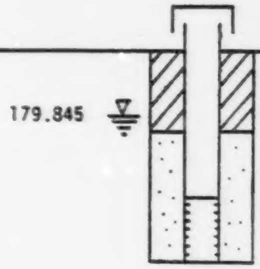
STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
Fill - black shaley gravel	182.79
Sand - tan sand with minor clay and silt	181.27
Clay - minor fine sand	180.35
Sand - fine sand	177.61
Till - grey clayey till - minor fine sand and pebbles	174.26
Bedrock - shale with quartz veins	130.06
	128.54

Water level for March 23, 1987

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: EC/SARNIA, H87-019	BOREHOLE No.: Prince of Wales (shallow #2) 2-86
CLIENT: Environment Canada	DATE COMPLETED: November 20, 1986
LOCATION: Sarnia	DRILLING METHOD: Mud Rotary (5 1/8 in.)
REFERENCE ELEVATION: 182.685 m AMSL	DRILL SUPERVISOR: Andy Backus

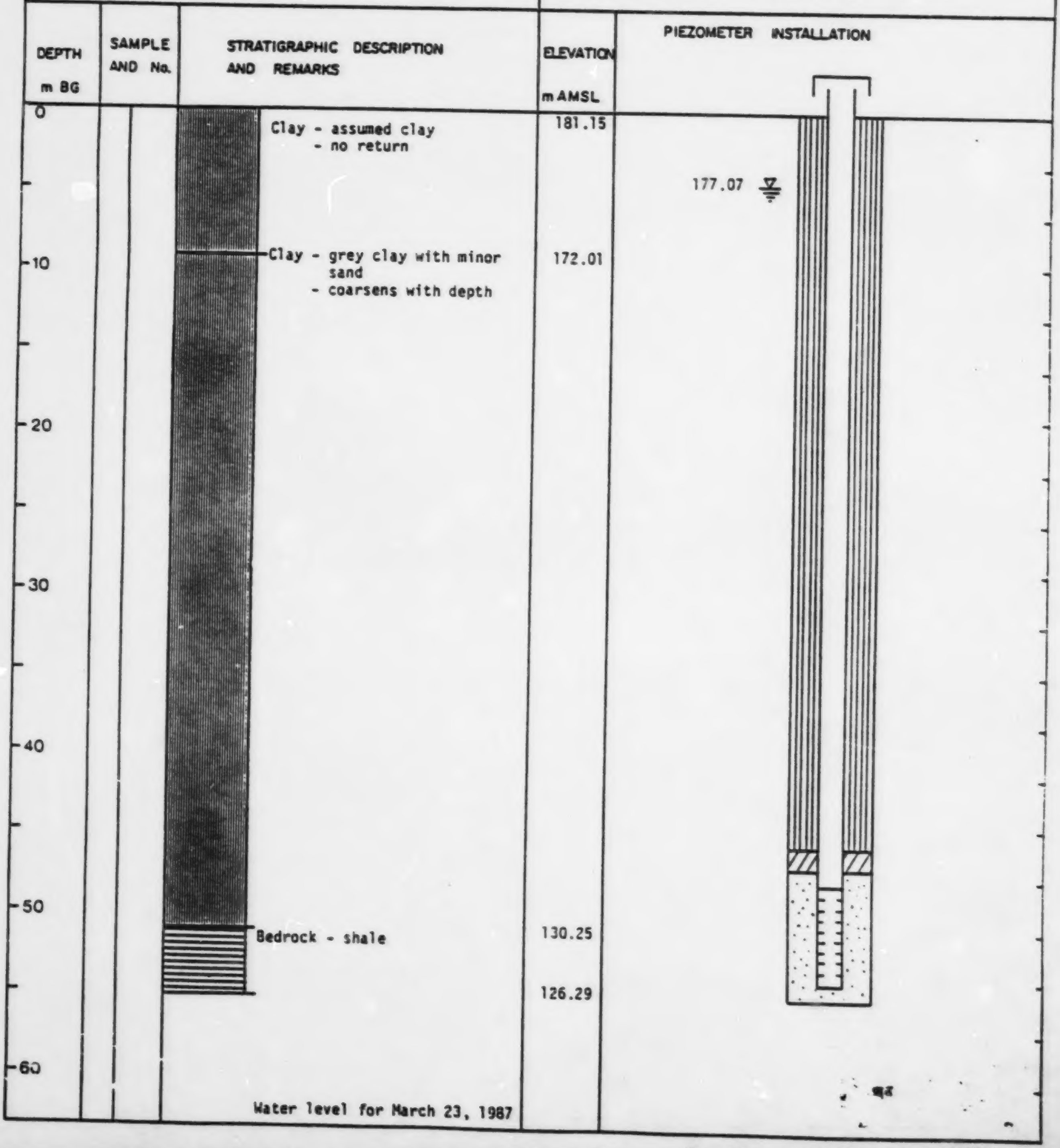




DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL	PIEZOMETER INSTALLATION
0		Fill - black shaley gravel	182.685	
		Sand - tan sand with minor clay and silt	181.27	
			180.35	
		Clay - minor fine sand		
		Sand - fine sand	177.50	
		Till - grey clayey till	174.26	
10		- minor fine sand and pebbles	172.63	
20				
30				
40				
50				
60				

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: EC/SARNIA, H87-019	BOREHOLE No.: Prince of Wales Pumping Well (#3) 3-86
CLIENT: Environment Canada	DATE COMPLETED: December 2, 1986
LOCATION: Sarnia	DRILLING METHOD: Mud Rotary (8 in.)
REFERENCE ELEVATION: 181.145 m AMSL	DRILL SUPERVISOR: Andy Backus

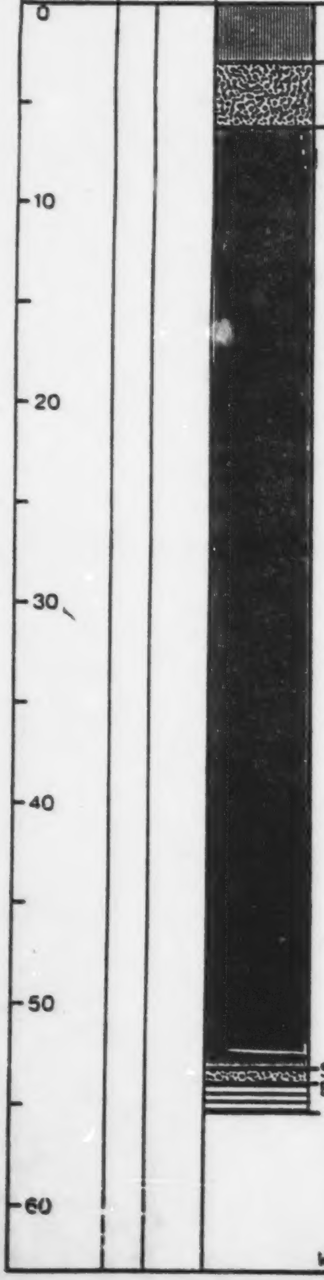

DEPTH m BG
SAMPLE AND No.
STRATIGRAPHIC DESCRIPTION AND REMARKS
ELEVATION m AMSL
PIEZOMETER INSTALLATION
0
10
20
30
40
50
60
Clay - assumed clay
- no return
181.15
177.07
Clay - grey clay with minor sand
- coarsens with depth
172.01
Bedrock - shale
130.25
126.29

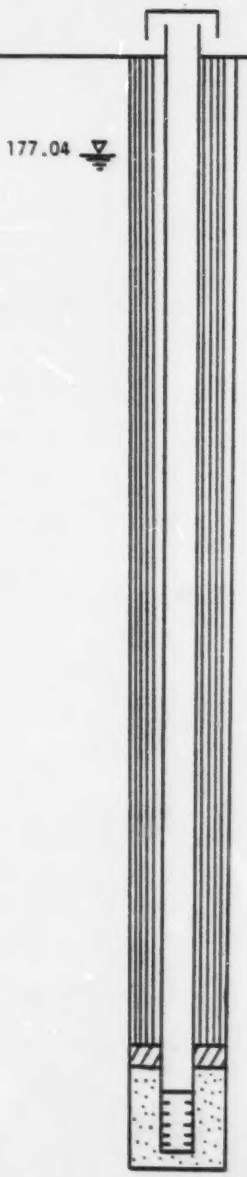
Water level for March 23, 1987

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: EC/SARNIA, H87-019	BOREHOLE No.: Victoria Park (#4) 4-86
CLIENT: Environment Canada	DATE COMPLETED: November 26, 1986
LOCATION: Sarnia	DRILLING METHOD: Mud Rotary (5 1/8 in.)
REFERENCE ELEVATION: 181.515 m AMSL	DRILL SUPERVISOR: Andy Backus

DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL	PIEZOMETER INSTALLATION
0		Clay - tan clay - minor sand	181.52	
		Sand	178.47	177.04
		Clay - grey clay - minor sand and occasional pebble	175.42	
		Sand	128.48	
		Bedrock - shale	127.88	
			126.35	



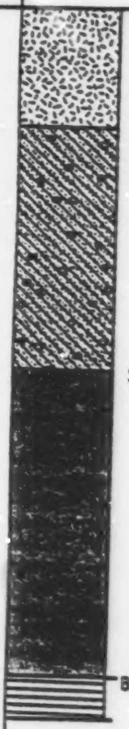


Water level for March 23, 1987

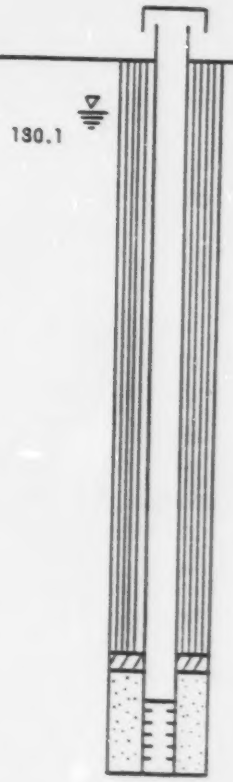
STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: EC/SARNIA, H87-019	BOREHOLE No.: Huron/Tashmoo (#5) 5-86
CLIENT: Environment Canada	DATE COMPLETED: November 21, 1986
LOCATION: Sarnia	DRILLING METHOD: Mud Rotary (5 1/8 in.)
REFERENCE ELEVATION: 183.455 m AMSL	DRILL SUPERVISOR: Andy Backus

DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
0		Fill - grey sandy clay - occasional pebbles	183.46
		Till - grey clay till - minor sand and clasts	177.35
		Silt - grey clayey silt - minor fine sand mixed with granules of black shale - coarsens with depth	165.16
		Bedrock - shale	149.92
			148.40



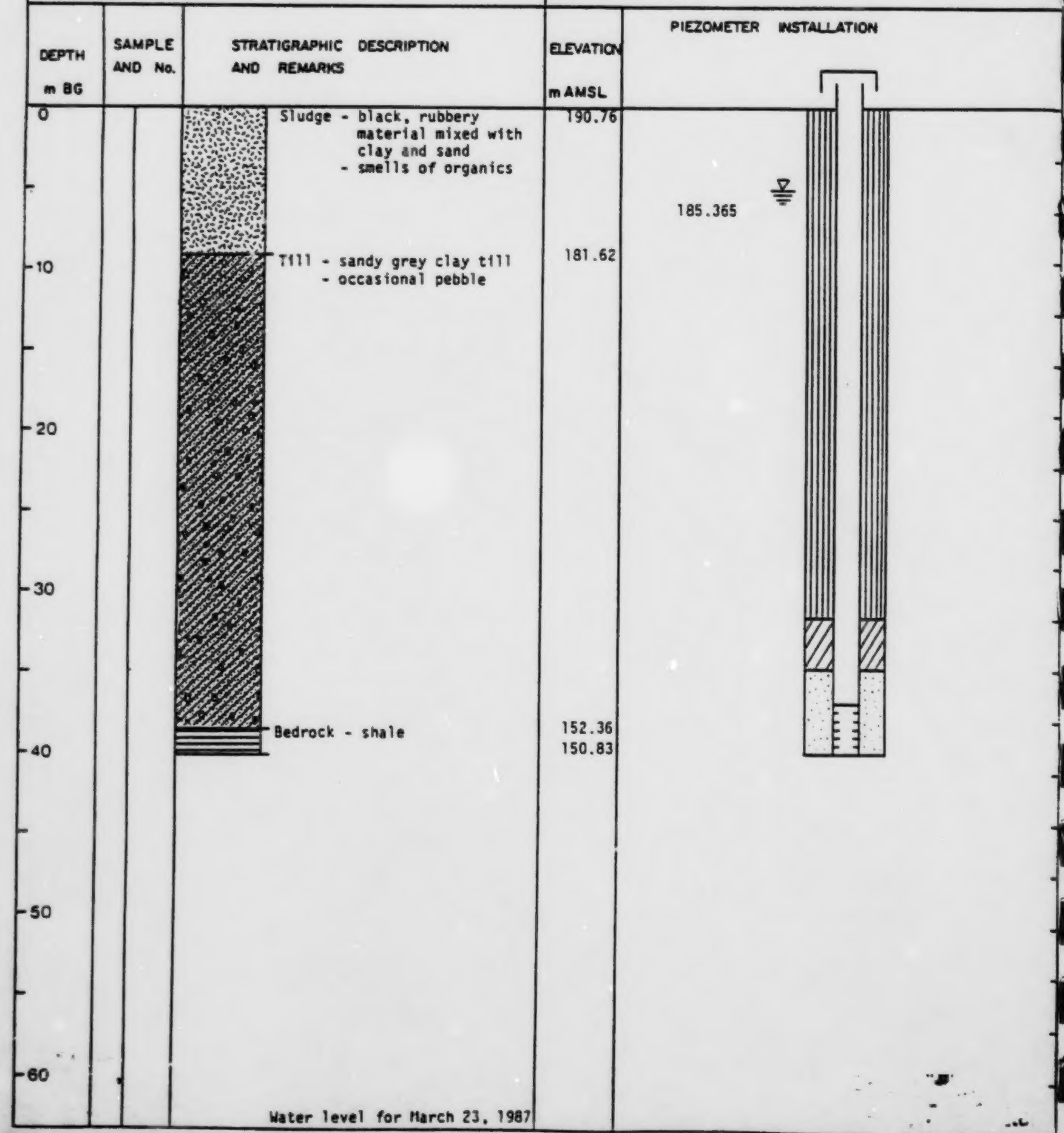
PIEZOMETER INSTALLATION



Water level for March 23, 1987

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: EC/SARNIA, H87-019	**BOREHOLE No.:** Sludge Lagoon (#6) 6-86
CLIENT: Environment Canada	**DATE COMPLETED:** November 25, 1986
LOCATION: Sarnia	**DRILLING METHOD:** Mud Rotary (5 1/8 in.)
REFERENCE ELEVATION: 190.760 m AMSL	**DRILL SUPERVISOR:** Andy Backus



DEPTH m BG
SAMPLE AND No.
STRATIGRAPHIC DESCRIPTION AND REMARKS
ELEVATION m AMSL
PIEZOMETER INSTALLATION
0
10
20
30
40
50
60
190.76
181.62
152.36
150.83
185.365

Sludge - black, rubbery material mixed with clay and sand
- smells of organics

Till - sandy grey clay till
- occasional pebble

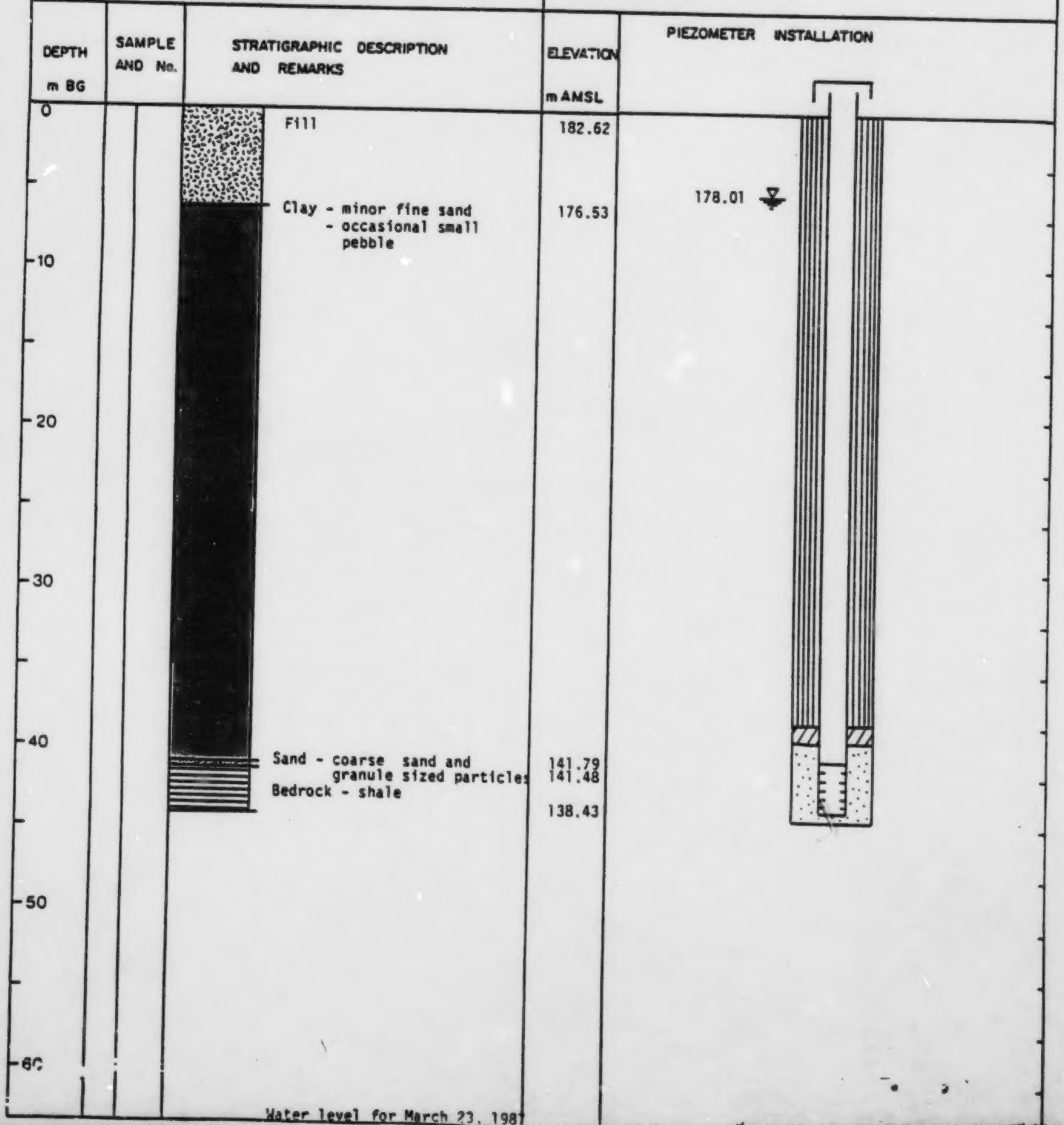
Bedrock - shale

Water level for March 23, 1987

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: EC/SARNIA, H87-019	BOREHOLE No.: Canadian National (#7) 7-86
CLIENT: Environment Canada	DATE COMPLETED: November 28, 1986
LOCATION: Sarnia	DRILLING METHOD: Mud Rotary (5 1/8 in.)
REFERENCE ELEVATION: 182.620 m AMSL	DRILL SUPERVISOR: Andy Backus

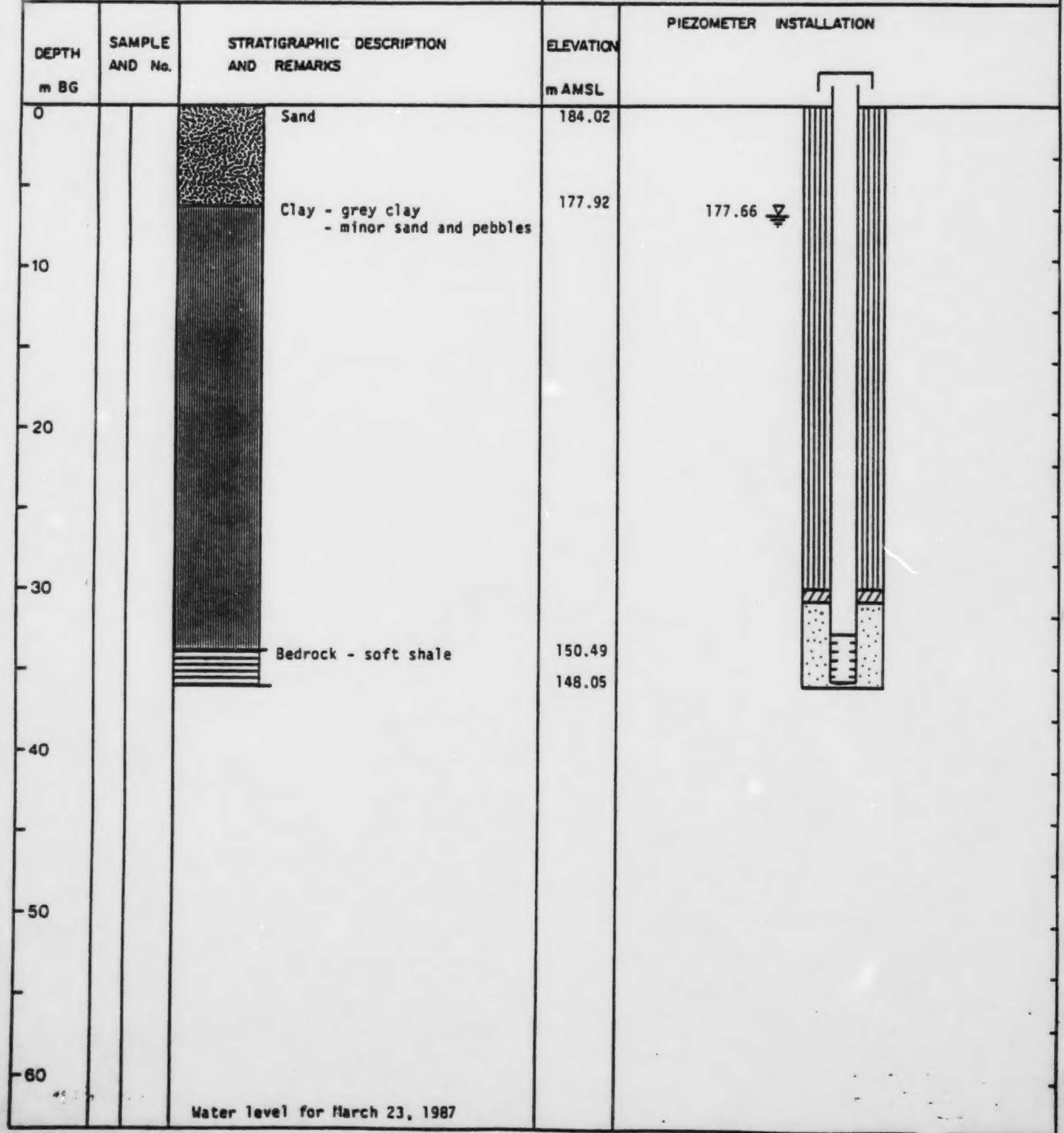
DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
		Fill	182.62
		Clay - minor fine sand - occasional small pebble	176.53
		Sand - coarse sand and granule sized particles	141.79
		Bedrock - shale	141.48
			138.43



Water level for March 23, 1987

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: EC/SARNIA, H87-019	BOREHOLE No.: Hydro Tower (#8) 8-86
CLIENT: Environment Canada	DATE COMPLETED: November 28, 1986
LOCATION: Sarnia	DRILLING METHOD: Mud Rotary (5 1/8 in.)
REFERENCE ELEVATION: 184.015 m AMSL	DRILL SUPERVISOR: Andy Backus


DEPTH m BG
SAMPLE AND No.
STRATIGRAPHIC DESCRIPTION AND REMARKS
ELEVATION m AMSL
PIEZOMETER INSTALLATION
0
10
20
30
40
50
60
177.66

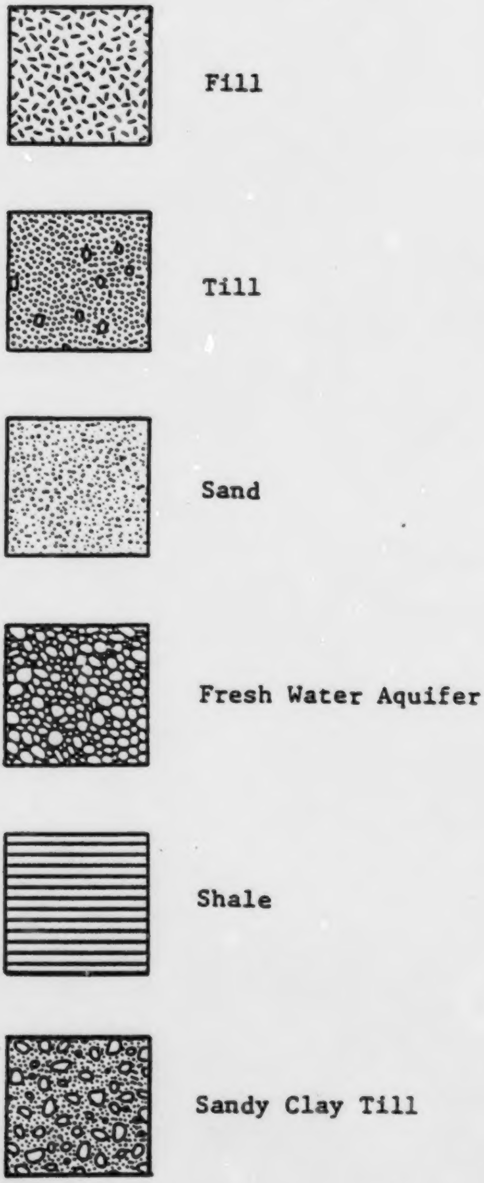
DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
0		Sand	184.02
		Clay - grey clay - minor sand and pebbles	177.92
		Bedrock - soft shale	150.49
			148.05

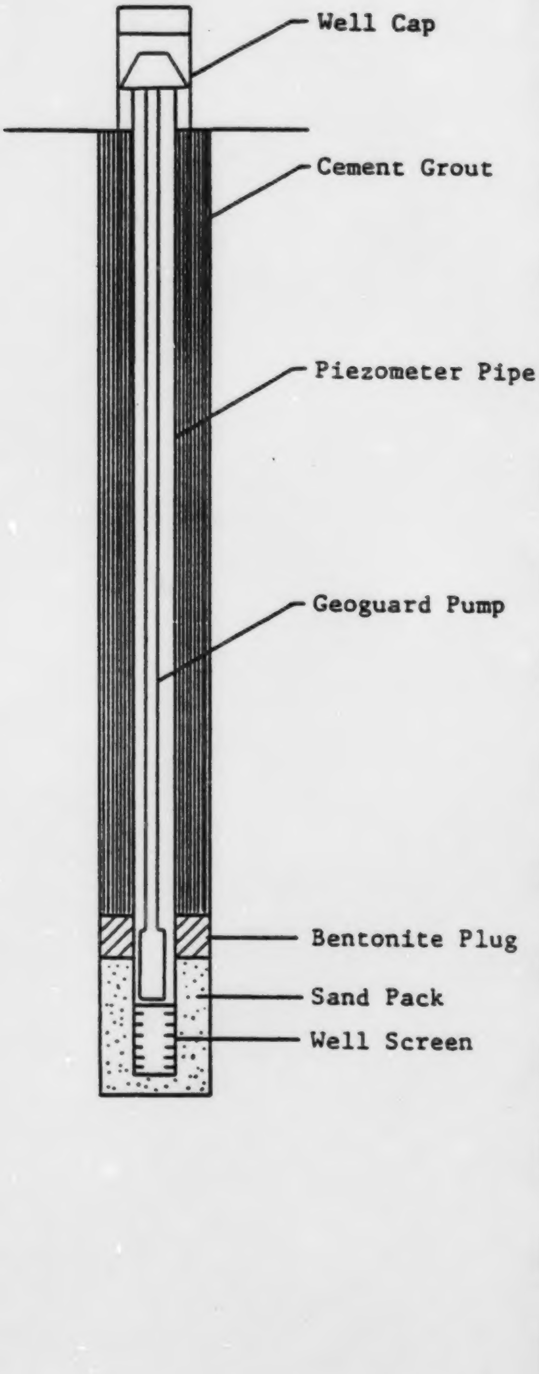
Water level for March 23, 1987

APPENDIX D3

Stratigraphic and Instrumentation Logs
1987 Monitoring Well Series

Legend
1987
Stratigraphic & Instrumentation Logs

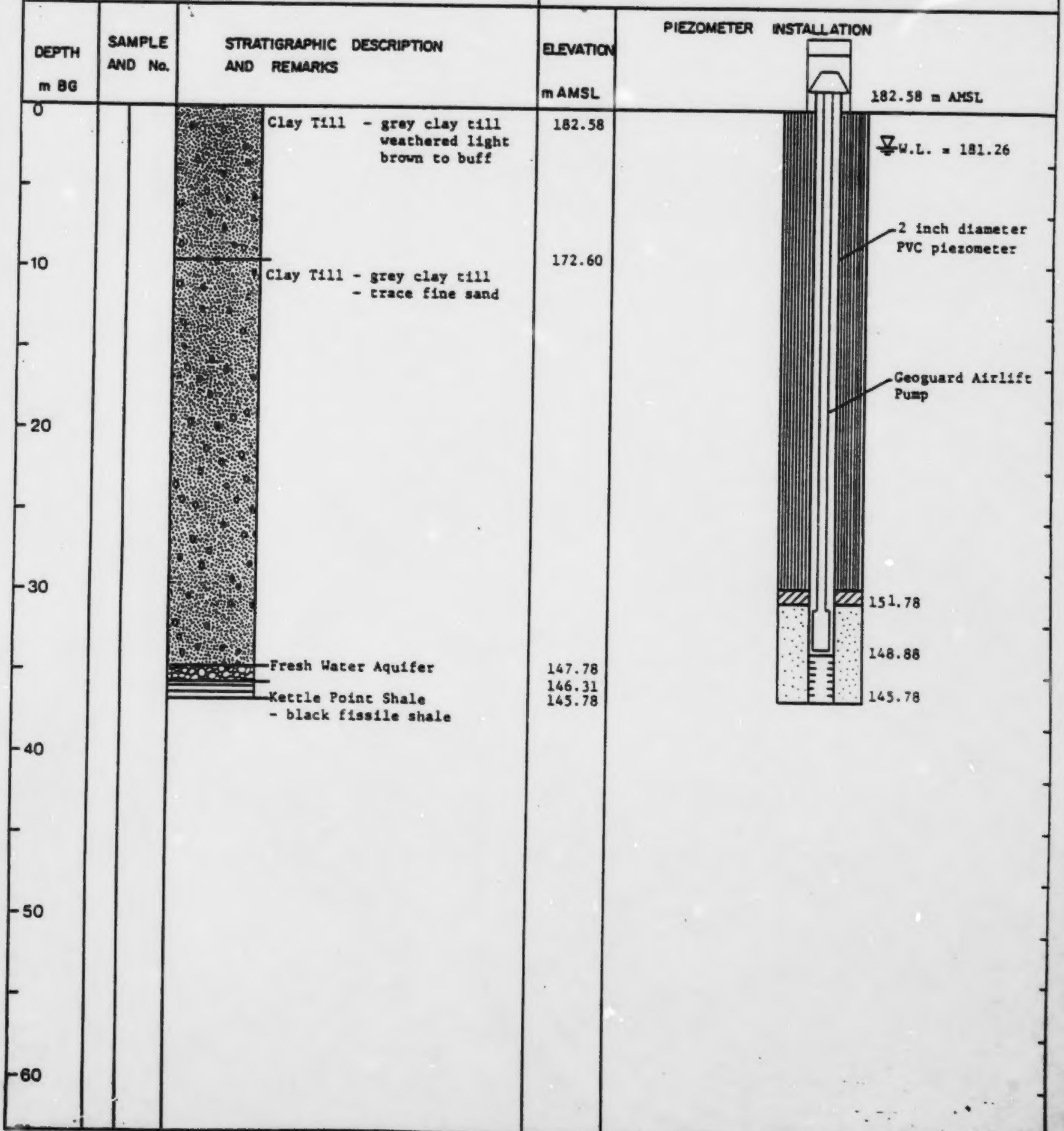

Fill
Till
Sand
Fresh Water Aquifer
Shale
Sandy Clay Till


Well Cap
Cement Grout
Piezometer Pipe
Geoguard Pump
Bentonite Plug
Sand Pack
Well Screen

STRATIGRAPHIC AND INSTRUMENTATION LOG

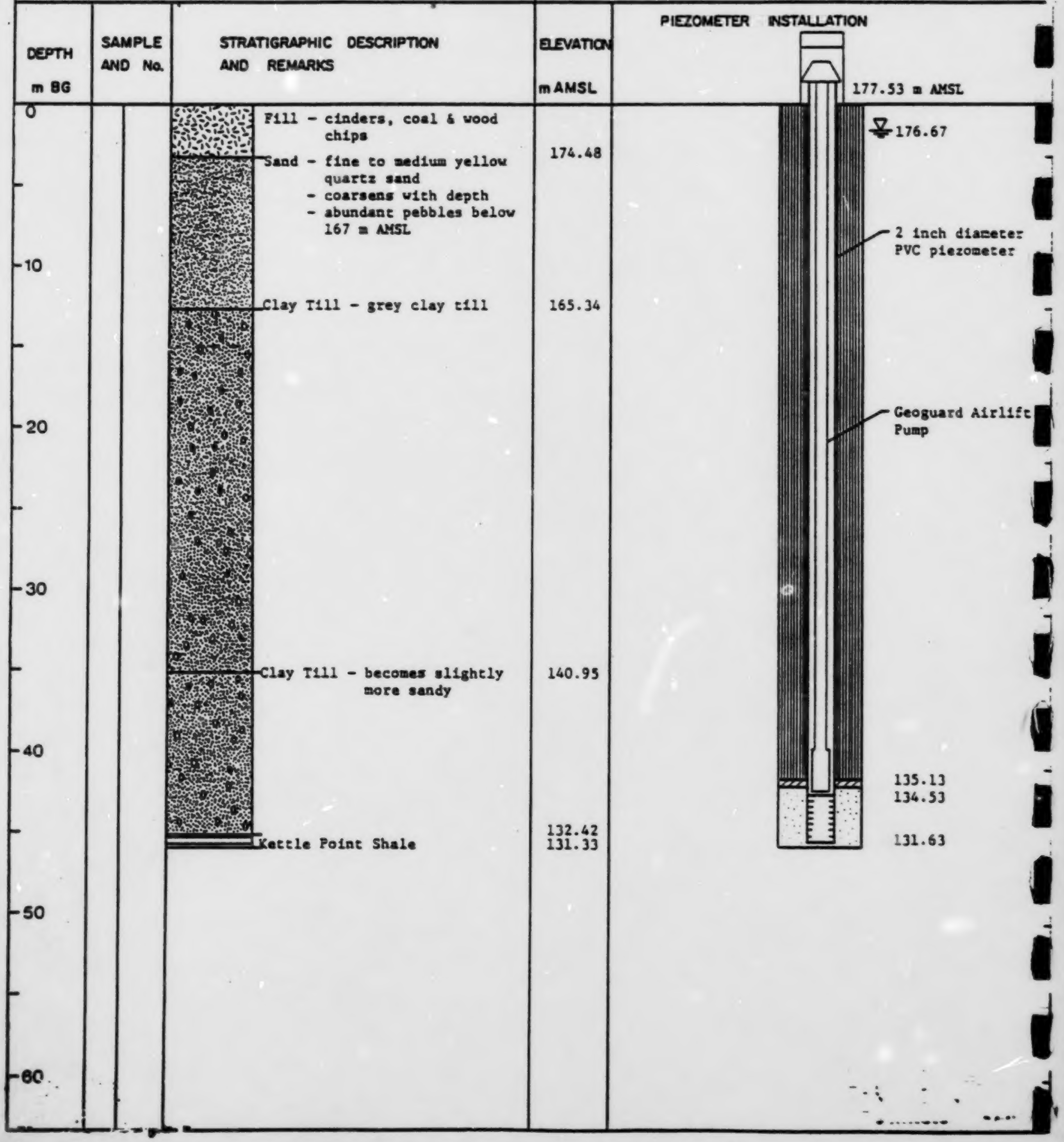
PROJECT NAME AND No.: Sarnia, H87-039	BOREHOLE No.: MSMW-1-87
CLIENT: Ontario Ministry of the Environment	DATE COMPLETED: August 6, 1987
LOCATION: Sarnia (Germain Park)	DRILLING METHOD: Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 183.29 m AMSL	DRILL SUPERVISOR: J. Markle, D. Belanger

STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
Clay Till - grey clay till weathered light brown to buff	182.58
Clay Till - grey clay till - trace fine sand	172.60
Fresh Water Aquifer	147.78
Kettle Point Shale - black fissile shale	146.31 145.78


DEPTH m BG
SAMPLE AND No.
0
10
20
30
40
50
60
PIEZOMETER INSTALLATION
182.58 m AMSL
W.L. = 181.26
2 inch diameter PVC piezometer
Geoguard Airlift Pump
151.78
148.88
145.78

STRATIGRAPHIC AND INSTRUMENTATION LOG

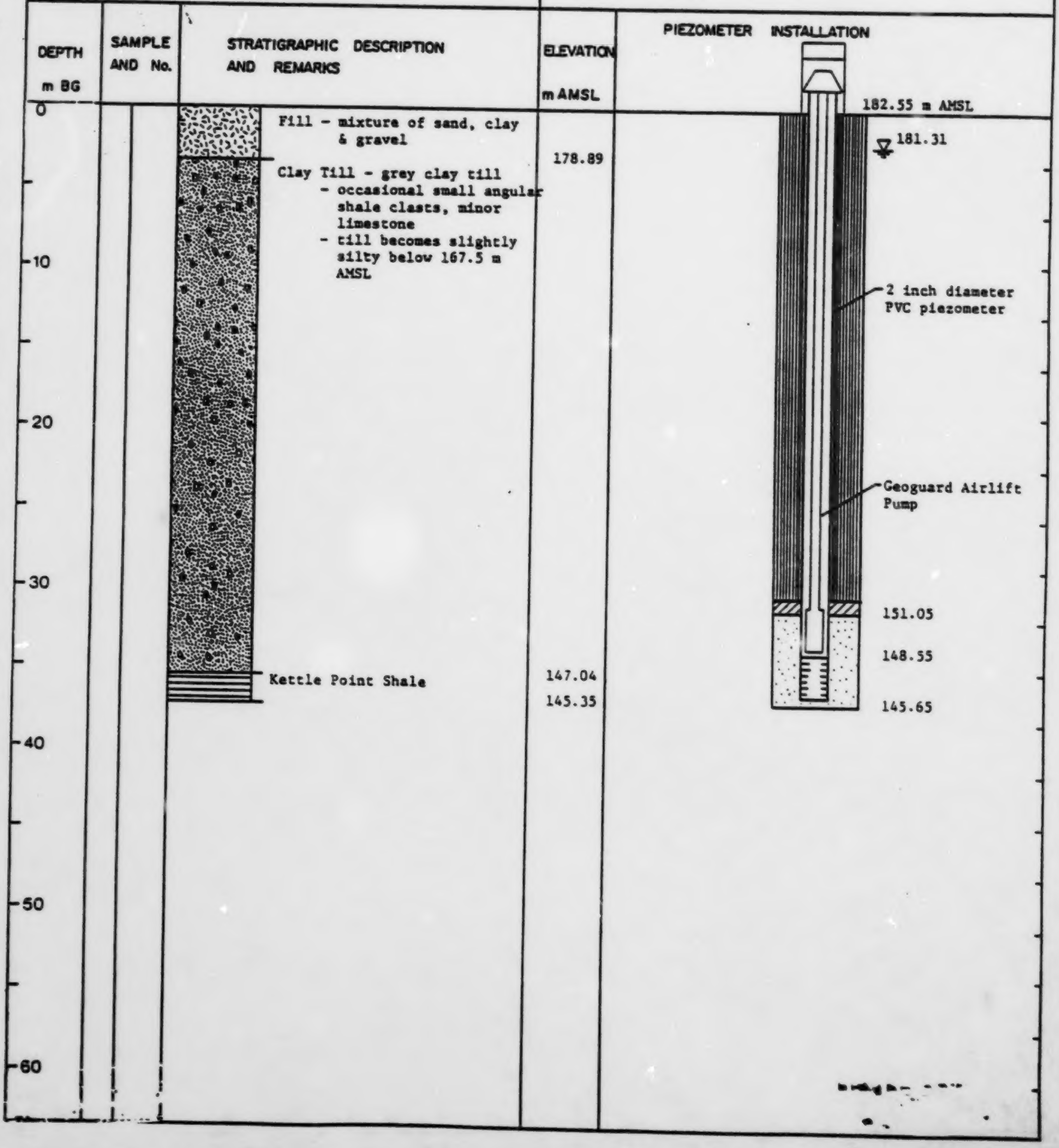
PROJECT NAME AND No. : Sarnia, H87-039	BOREHOLE No. : MSMW-2-87
CLIENT : Ontario Ministry of the Environment	DATE COMPLETED: August 7, 1987
LOCATION : Sarnia (Centennial Park)	DRILLING METHOD : Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION : 178.24 m AMSL	DRILL SUPERVISOR : J. Markle, D. Belanger


DEPTH m BG
0
10
20
30
40
50
60
SAMPLE AND No.
PIEZOMETER INSTALLATION
177.53 m AMSL
176.67
2 inch diameter PVC piezometer
Geoguard Airlift Pump
135.13
134.53
131.63

STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
Fill - cinders, coal & wood chips	
Sand - fine to medium yellow quartz sand - coarsens with depth - abundant pebbles below 167 m AMSL	174.48
Clay Till - grey clay till	165.34
Clay Till - becomes slightly more sandy	140.95
	132.42
Kettle Point Shale	131.33

STRATIGRAPHIC AND INSTRUMENTATION LOG

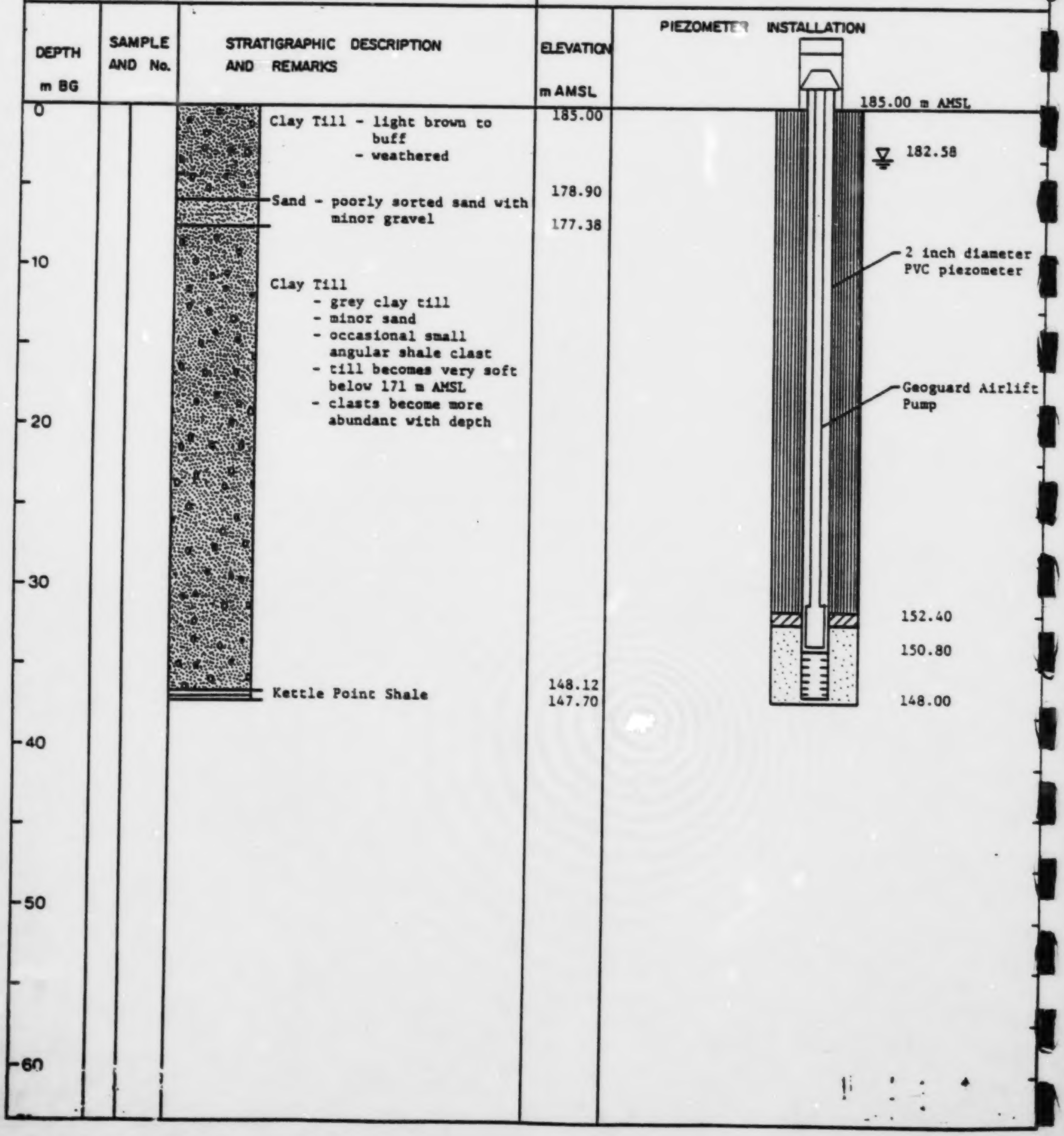
PROJECT NAME AND No.: Sarnia, H87-039	BOREHOLE No.: MSMW-3-87
CLIENT: Ontario Ministry of the Environment	DATE COMPLETED: August 10, 1987
LOCATION: Sarnia (Talfourd St.)	DRILLING METHOD: Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 183.41 m AMSL	DRILL SUPERVISOR: J. Markle


DEPTH m BG
SAMPLE AND No.
0
10
20
30
40
50
60
PIEZOMETER INSTALLATION
182.55 m AMSL
181.31
2 inch diameter PVC piezometer
Geoguard Airlift Pump
151.05
148.55
145.65

STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
Fill - mixture of sand, clay & gravel	178.89
Clay Till - grey clay till - occasional small angular shale clasts, minor limestone - till becomes slightly silty below 167.5 m AMSL	147.04
Kettle Point Shale	145.35

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: Sarnia, H87-039	BOREHOLE No.: MSMW-4-87
CLIENT: Ontario Ministry of the Environment	DATE COMPLETED: August 11, 1987
LOCATION: Sarnia (Campbell Street)	DRILLING METHOD: Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 185.70 m AMSL	DRILL SUPERVISOR: J. Markle



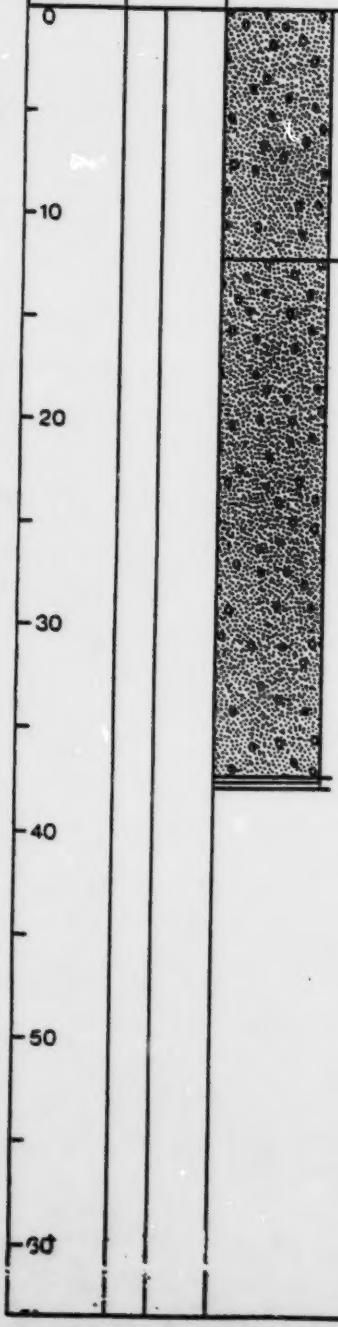
DEPTH m BG
SAMPLE AND No.
STRATIGRAPHIC DESCRIPTION AND REMARKS
ELEVATION m AMSL
PIEZOMETER INSTALLATION
0
10
20
30
40
50
60
185.00 m AMSL
182.58
2 inch diameter PVC piezometer
Geoguard Airlift Pump
152.40
150.80
148.00

Stratigraphic Description and Remarks	Elevation m AMSL
Clay Till - light brown to buff - weathered	185.00
Sand - poorly sorted sand with minor gravel	178.90 177.38
Clay Till - grey clay till - minor sand - occasional small angular shale clast - till becomes very soft below 171 m AMSL - clasts become more abundant with depth	
Kettle Point Shale	148.12 147.70

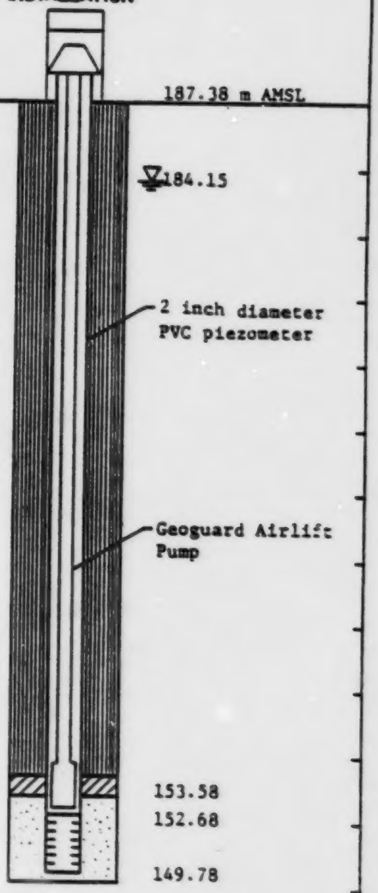
STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: Sarnia, H87-039	**BOREHOLE No.:** MSMW-5-87
CLIENT: Ontario Ministry of the Environment	**DATE COMPLETED:** August 12, 1987
LOCATION: Sarnia (LaSalle Rd. & Hwy. 40)	**DRILLING METHOD:** Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 187.96 m AMSL	**DRILL SUPERVISOR:** J. Markle

DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
0		Clay Till - stiff grey clay till - occasional small angular shale clast	187.38
		Clay Till - soft silty clay till - occasional small angular shale & limestone clast	175.19
		Kettle Point Shale	149.89 149.58


0
10
20
30
40
50
30

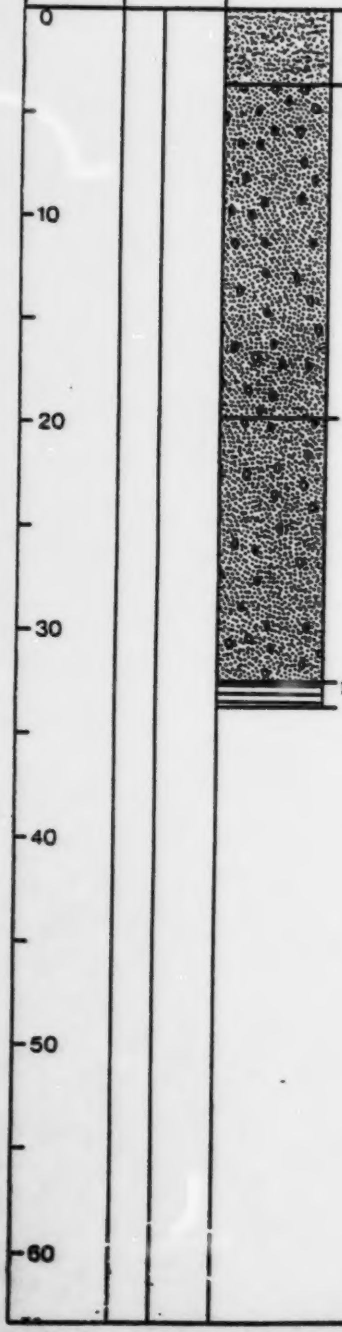
PIEZOMETER INSTALLATION


187.38 m AMSL
184.15
2 inch diameter PVC piezometer
Geoguard Airlift Pump
153.58
152.68
149.78

STRATIGRAPHIC AND INSTRUMENTATION LOG

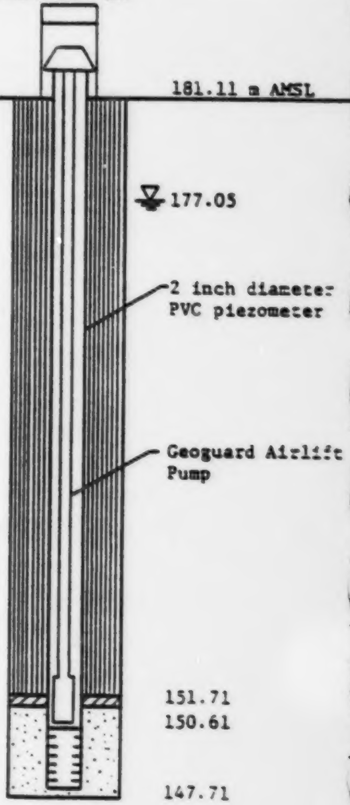
PROJECT NAME AND No.: Sarnia, H87-039	BOREHOLE No.: MSMW-6-87
CLIENT: Ontario Ministry of the Environment	DATE COMPLETED: August 14, 1987
LOCATION: Sarnia (Guthrie Park)	DRILLING METHOD: Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 181.86 m AMSL	DRILL SUPERVISOR: J. Markle

DEPTH m BG | SAMPLE AND No. | STRATIGRAPHIC DESCRIPTION AND REMARKS | ELEVATION m AMSL | PIEZOMETER INSTALLATION



0
10
20
30
40
50
60

STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
Sand - very fine to fine - light orange to brown - minor silt & clay	181.11
Clay Till - stiff grey clay till - occasional small angular shale clast	177.45
Clay Till - dark grey - minor sand - abundant small angular shale clasts	171.97
Kettle Point Shale - very weathered & fractured	148.50 147.41

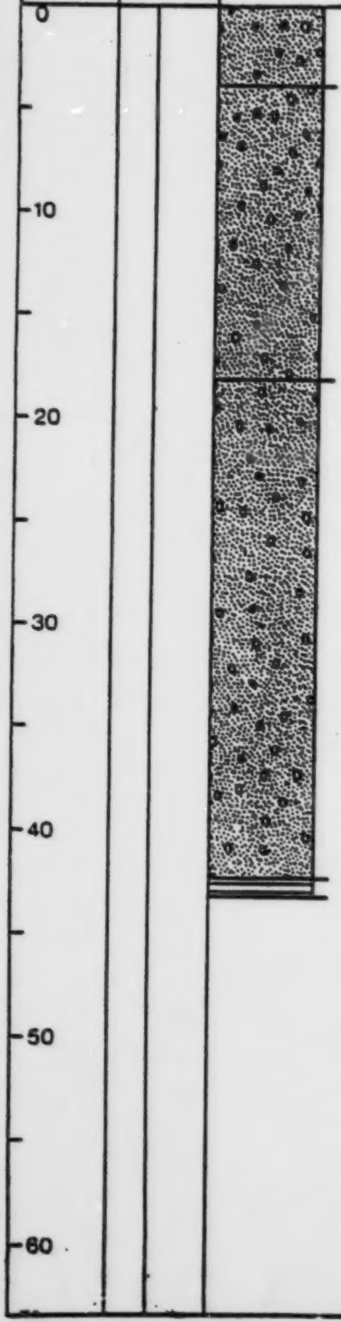


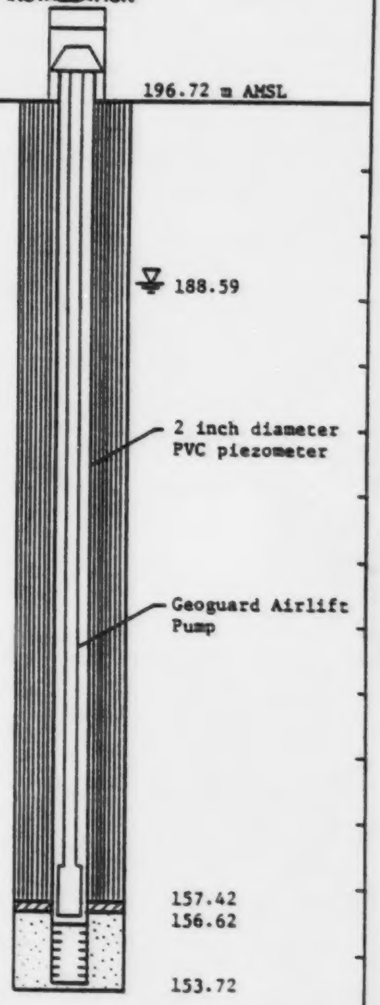
181.11 m AMSL
177.05
2 inch diameter PVC piezometer
Geoguard Airlift Pump
151.71
150.61
147.71

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: Sarnia, H87-039	BOREHOLE No.: MSMW-7-87
CLIENT: Ontario Ministry of the Environment	DATE COMPLETED: August 17, 1987
LOCATION: Sarnia (McGregor Side road)	DRILLING METHOD: Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 197.35 m AMSL	DRILL SUPERVISOR: J. Markle

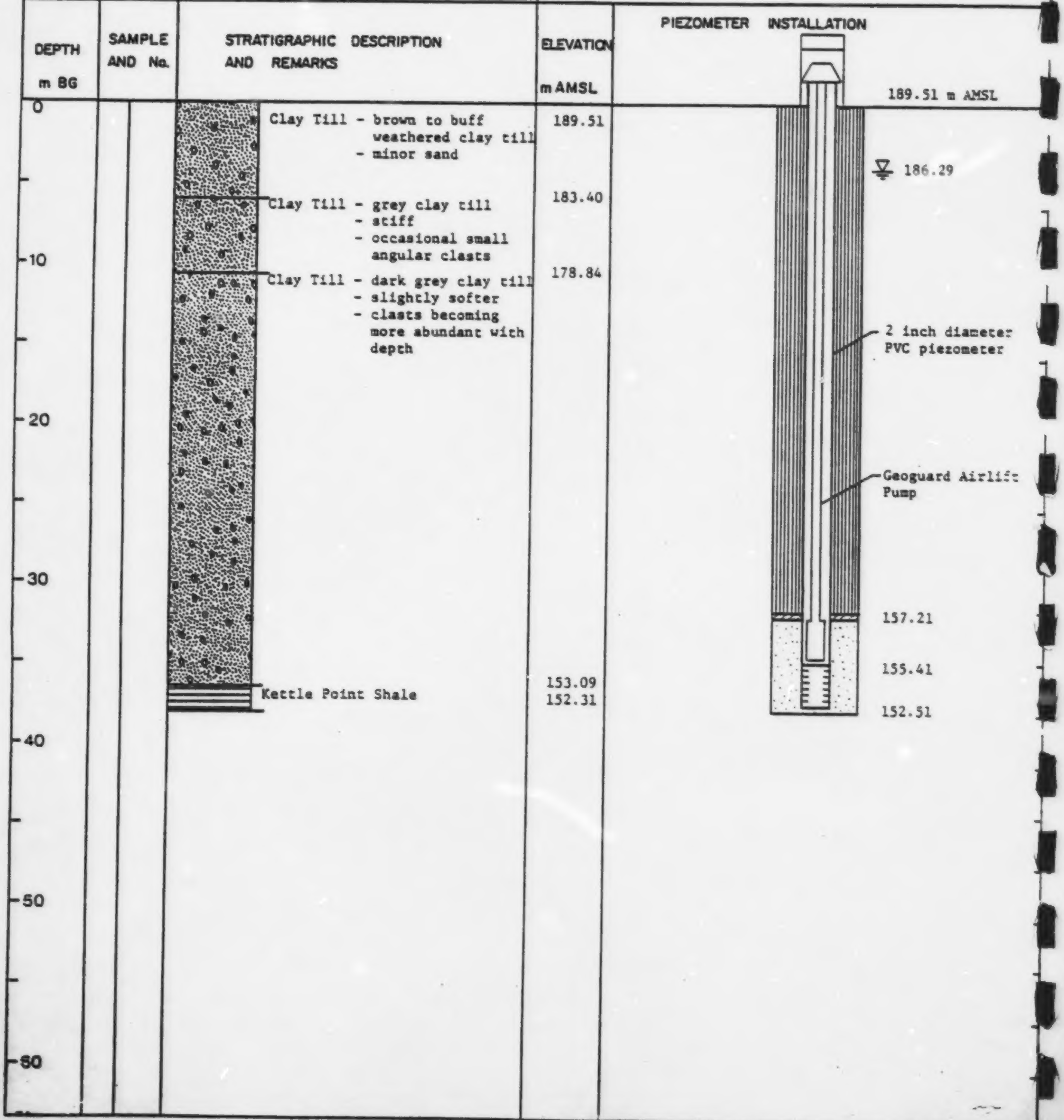
DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL	PIEZOMETER INSTALLATION
0		Clay Till - weathered light brown to buff - minor sand		196.72 m AMSL
		Clay Till - light grey clay till - stiff - few clasts	192.76	
				188.59
		Clay Till - light grey clay till - becoming soft & pliable - occasional small angular shale & limestone clasts	178.43	
				157.42
				156.62
		Kettle Point Shale - very hard shale - no weathered surface or fractures	154.35 153.42	153.72


0
10
20
30
40
50
60


196.72 m AMSL
188.59
2 inch diameter PVC piezometer
Geoguard Airlift Pump
157.42
156.62
153.72

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No. : Sarnia, H87-039	**BOREHOLE No. :** MSMW-8-87
CLIENT : Ontario Ministry of the Environment	**DATE COMPLETED :** August 18, 1987
LOCATION : Sarnia (LaSalle Rd.)	**DRILLING METHOD :** Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION : 190.26 m AMSL	**DRILL SUPERVISOR :** J. Markle

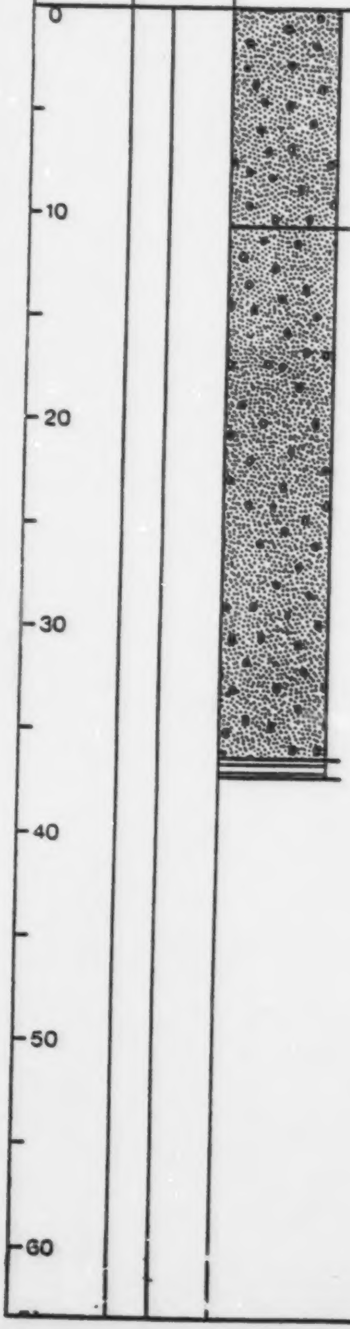

DEPTH m BG
0
10
20
30
40
50
60
SAMPLE AND No.
PIEZOMETER INSTALLATION
189.51 m AMSL
186.29
2 inch diameter PVC piezometer
Geoguard Airlift Pump
157.21
155.41
152.51

STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
Clay Till - brown to buff weathered clay till - minor sand	189.51
Clay Till - grey clay till - stiff - occasional small angular clasts	183.40
Clay Till - dark grey clay till - slightly softer - clasts becoming more abundant with depth	178.84
Kettle Point Shale	153.09 152.31

STRATIGRAPHIC AND INSTRUMENTATION LOG

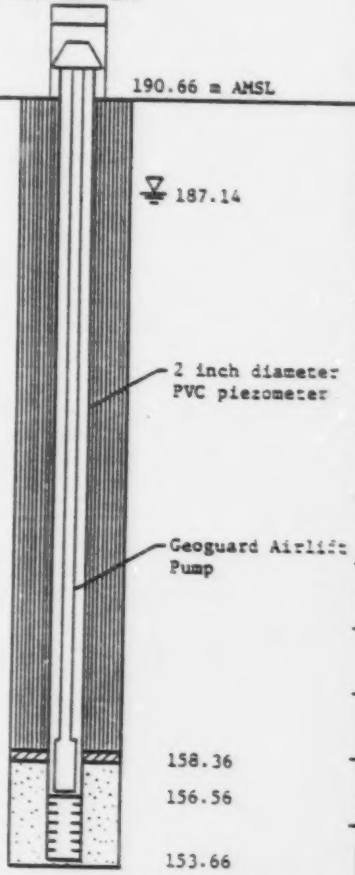
PROJECT NAME AND No.: Sarnia, H87-039	BOREHOLE No.: MSMW-9-87
CLIENT: Ontario Ministry of the Environment	DATE COMPLETED: August 19, 1987
LOCATION: Sarnia (Churchill Rd.)	DRILLING METHOD: Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 191.58 m AMSL	DRILL SUPERVISOR: J. Markle

DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
		Clay Till - light brown to grey becoming light grey below 184 m AMSL - soft & plastic below 184 m AMSL	190.66
		Clay Till - dary grey clay till - abundant shale clasts - slightly sandy below 170 m AMSL	179.99
		Kettle Point Shale - weathered & fractured surface	154.08 153.36



0
10
20
30
40
50
60

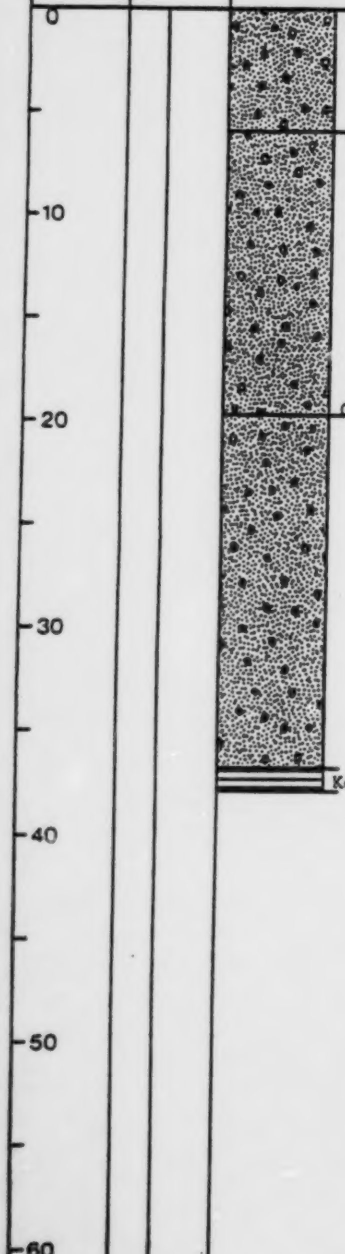
PIEZOMETER INSTALLATION



190.66 m AMSL
187.14
2 inch diameter PVC piezometer
Geoguard Airlift Pump
158.36
156.56
153.66

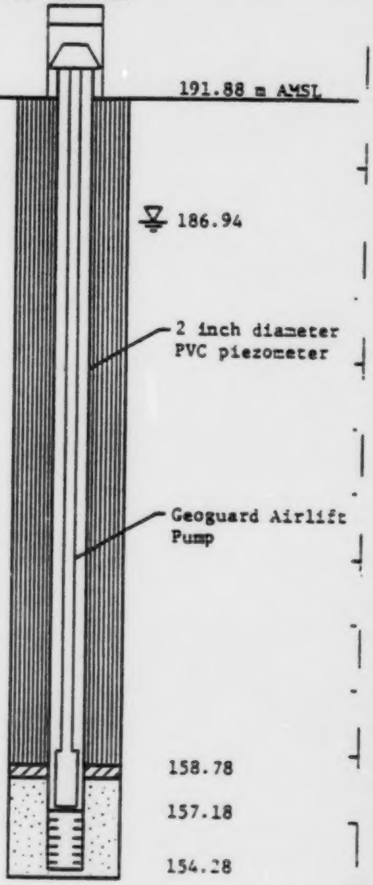
STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: Sarnia, H87-039	**BOREHOLE No.:** MSMW-10-87
CLIENT: Ontario Ministry of the Environment	**DATE COMPLETED:** August 20, 1987
LOCATION: Sarnia (Air Products)	**DRILLING METHOD:** Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 192.77 m AMSL	**DRILL SUPERVISOR:** J. Markle


DEPTH m BG
0
10
20
30
40
50
60

SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
	Clay Till - light brown weathered clay till - minor fine sand	191.88
	Clay Till - grey clay till - abundant small angular shale clasts	185.78
	Clay Till - dark grey clay till - abundant small angular shale & limestone clasts - increasing sand content with depth	172.07
	Kettle Point Shale	155.00 153.98

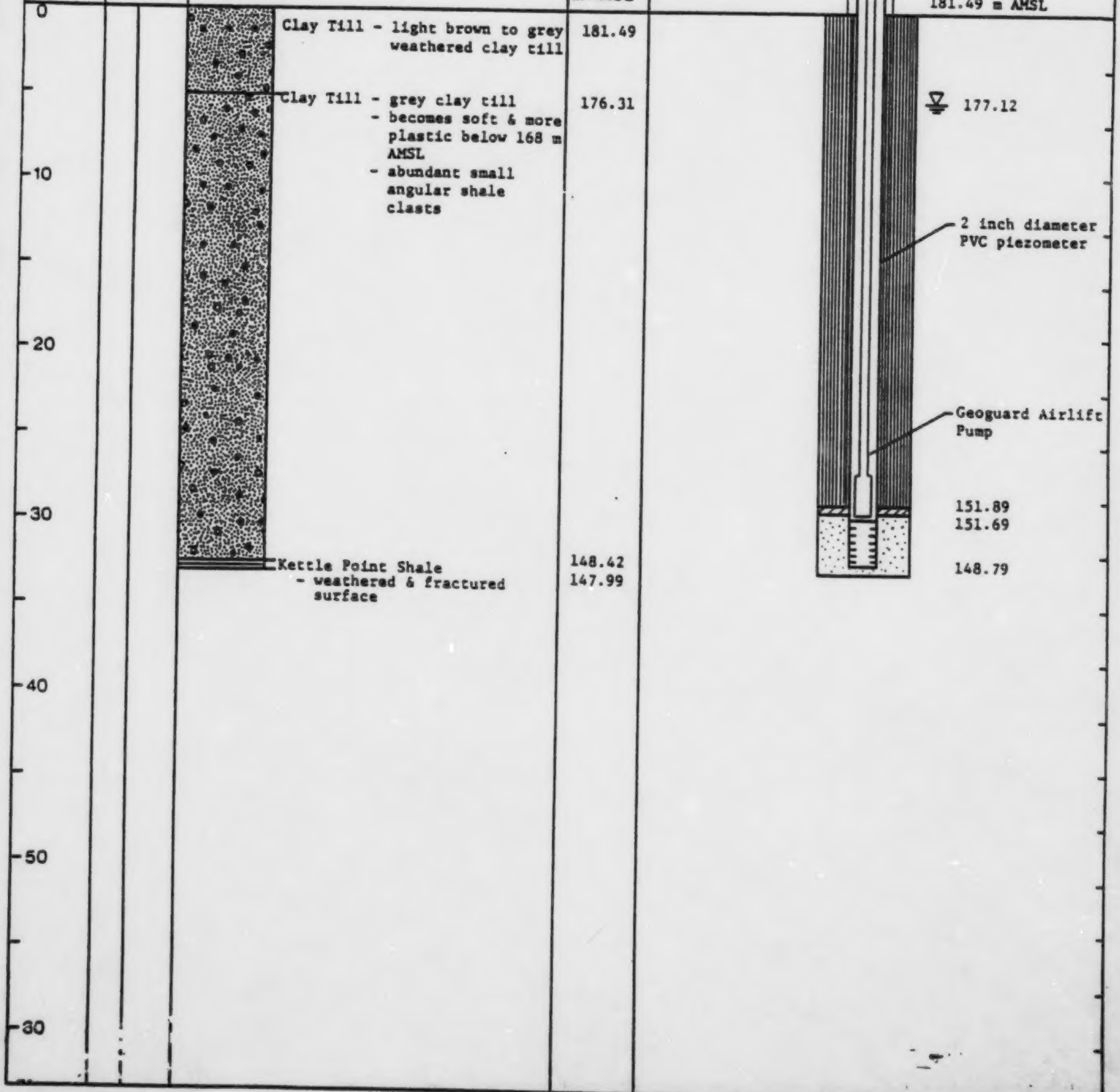
PIEZOMETER INSTALLATION


191.88 m AMSL
186.94
2 inch diameter PVC piezometer
Geoguard Airlift Pump
158.78
157.18
154.28

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: Sarnia, H87-039	**BOREHOLE No.:** MSMW-11-87
CLIENT: Ontario Ministry of the Environment	**DATE COMPLETED:** August 25, 1987
LOCATION: Sarnia (Polymer Rd.)	**DRILLING METHOD:** Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 182.19 m AMSL	**DRILL SUPERVISOR:** J. Markle

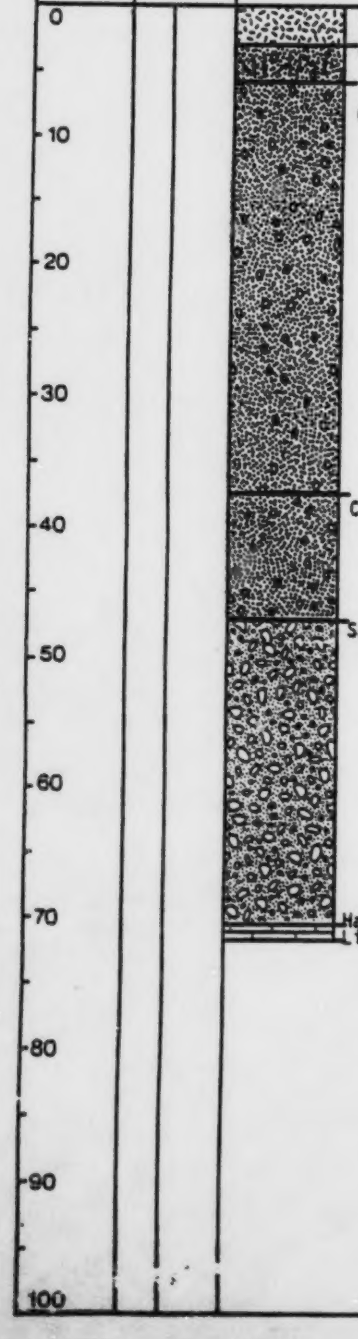
DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
0		Clay Till - light brown to grey weathered clay till	181.49
		Clay Till - grey clay till - becomes soft & more plastic below 168 m AMSL - abundant small angular shale clasts	176.31
		Kettle Point Shale - weathered & fractured surface	148.42 147.99


PIEZOMETER INSTALLATION
181.49 m AMSL
177.12
2 inch diameter PVC piezometer
Geoguard Airlift Pump
151.89
151.69
148.79
0
10
20
30
40
50
30

STRATIGRAPHIC AND INSTRUMENTATION LOG

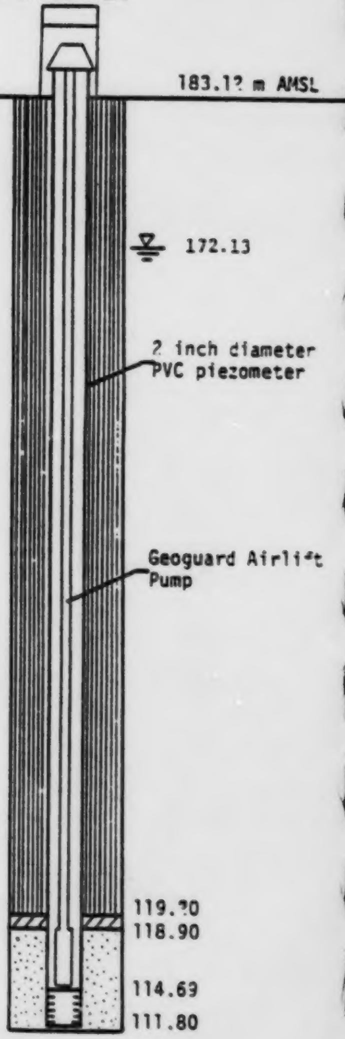
PROJECT NAME AND No.: Sarnia, H87-039	**BOREHOLE No.:** MSMW-12-87
CLIENT: Ontario Ministry of the Environment	**DATE COMPLETED:** September 3, 1987
LOCATION: Sarnia, Ontario (Polysar)	**DRILLING METHOD:** Mud Rotary, 5¼ inch bit
REFERENCE ELEVATION: 183.12 m AMSL	**DRILL SUPERVISOR:** J. Markle, D. Belanger

DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
0		Fill - bricks & gravel fill	
		Clay Till - weathered light brown to buff	180.07
		Clay Till - grey clay till - stiff to firm - trace fine to coarse sand & gravel	177.02
		Clay Till - grey clay till - soft - trace - fine to coarse sand & gravel	145.02
		Sandy Clay Till - dark grey - variable sandy gravel till to silty till - dense - abundant boulders	135.27
		Hamilton Limestone	112.41 111.52



0
10
20
30
40
50
60
70
80
90
100

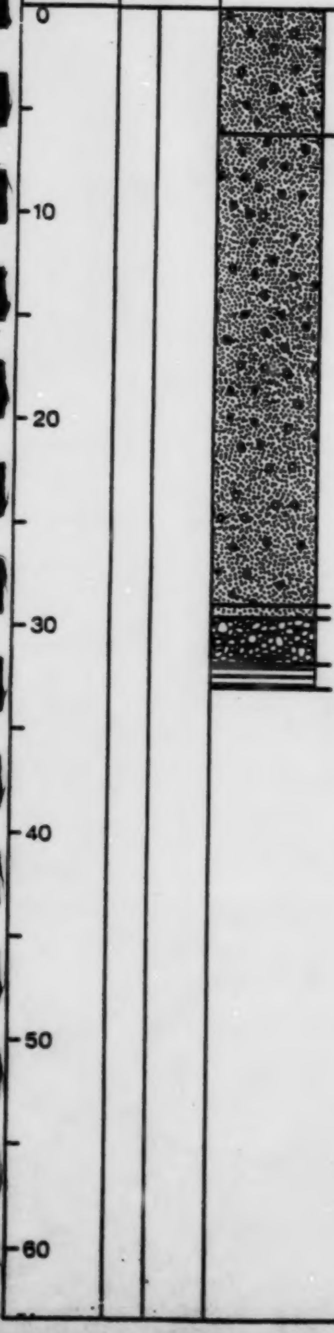
PIEZOMETER INSTALLATION



183.12 m AMSL
172.13
2 inch diameter PVC piezometer
Geoguard Airlift Pump
119.20
118.90
114.63
111.80

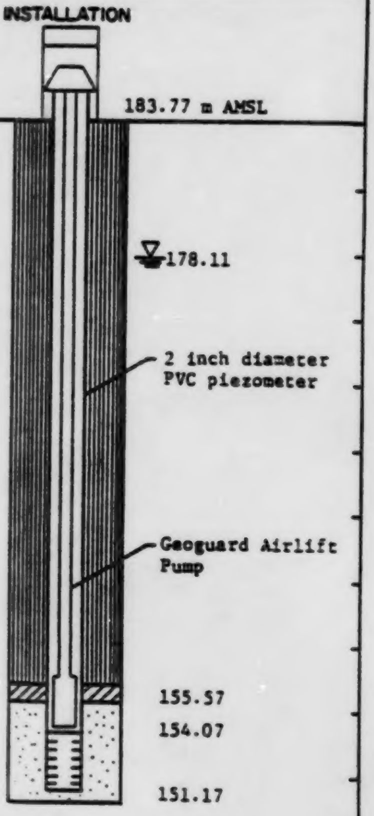
STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: Sarnia, H87-039	**BOREHOLE No.:** MSMW-13-87
CLIENT: Ontario Ministry of the Environment	**DATE COMPLETED:** September 10, 1987
LOCATION: Sarnia (Suncor)	**DRILLING METHOD:** Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 184.66 m AMSL	**DRILL SUPERVISOR:** J. Markle


DEPTH m BG
0
10
20
30
40
50
60

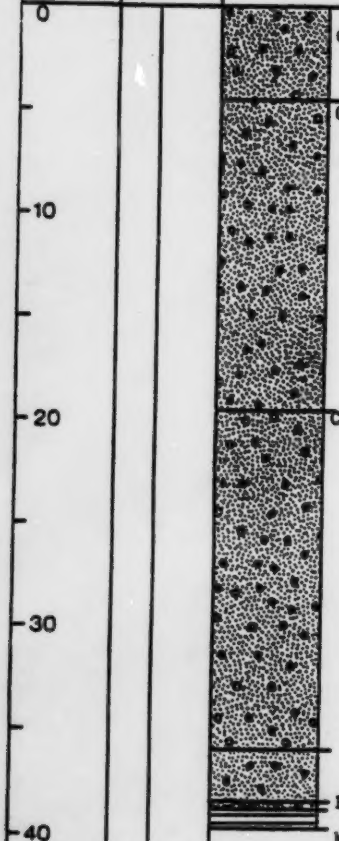
SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
	Clay Till - light brown to grey weathered clay till	183.77
	Clay Till - grey clay till - soft & plastic - abundant small angular shale clasts	177.67
	- boulders	154.66
	Fresh Water Aquifer - poorly sorted sand with clay & broken bedrock	154.20
		152.07
	Kettle Point Shale - weathered surface	150.87

PIEZOMETER INSTALLATION


183.77 m AMSL
178.11
2 inch diameter PVC piezometer
Geoguard Airlift Pump
155.57
154.07
151.17

STRATIGRAPHIC AND INSTRUMENTATION LOG

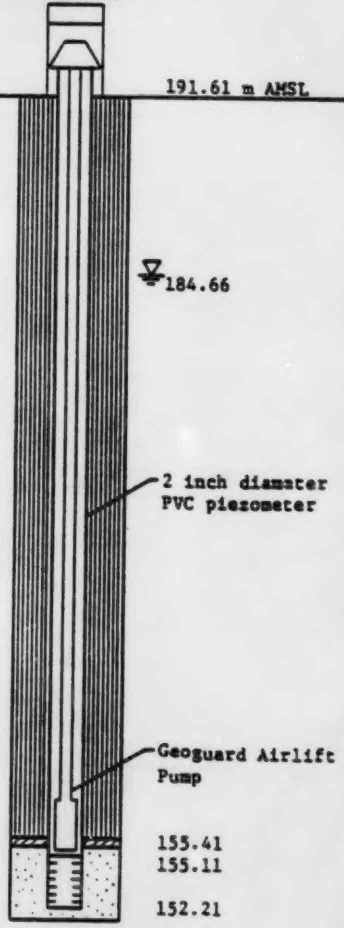
PROJECT NAME AND No.: Sarnia, H87-039	BOREHOLE No.: MSMW-14-87
CLIENT: Ontario Ministry of the Environment	DATE COMPLETED: September 4, 1987
LOCATION: Sarnia (DOW Brine)	DRILLING METHOD: Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 192.32 m AMSL	DRILL SUPERVISOR: J. Markle



DEPTH m BG
0
10
20
30
40
50
60

DEPTH m BG	SAMPLE AND No.	STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
		Clay Till - brown to buff weathered clay till	191.61
		Clay Till - grey clay till - stiff - occasional small angular shale clasts	187.04
		Clay Till - dark grey clay till - soft & plastic - occasional small angular shale & limestone clasts	171.80
		- abundant angular clasts & boulders	155.64
		Fresh Water Aquifer	151.99
		- poorly sorted sand & gravel	151.68
		Kettle Point Shale	151.07

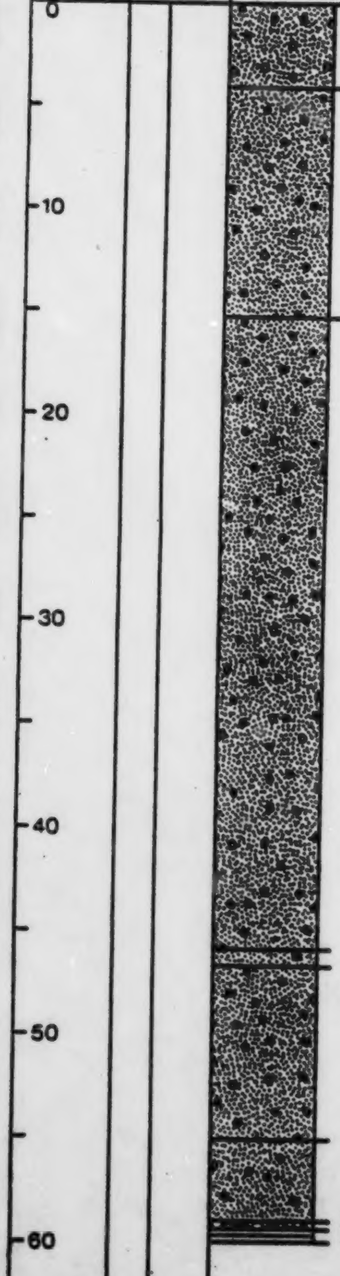
PIEZOMETER INSTALLATION



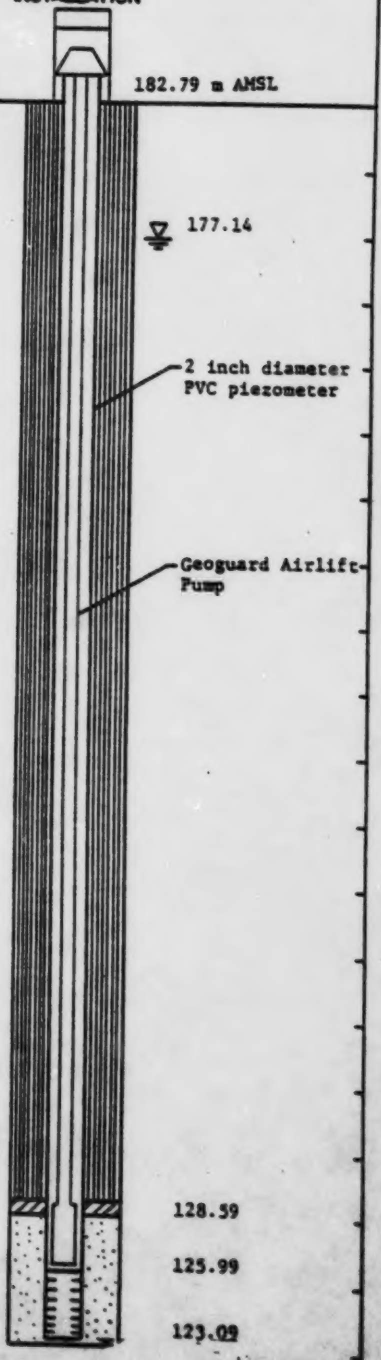
191.61 m AMSL
184.66
2 inch diameter PVC piezometer
Geoguard Airlift Pump
155.41
155.11
152.21

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME AND No.: Sarnia, H87-039	**BOREHOLE No.:** MSMW-15-87
CLIENT: Ontario Ministry of the Environment	**DATE COMPLETED:** September 9, 1987
LOCATION: Sarnia (DOW)	**DRILLING METHOD:** Mud Rotary, 5 1/4 inch bit
REFERENCE ELEVATION: 183.69 m AMSL	**DRILL SUPERVISOR:** J. Markle


DEPTH m BG
SAMPLE AND No.
0
10
20
30
40
50
60

STRATIGRAPHIC DESCRIPTION AND REMARKS	ELEVATION m AMSL
Clay Till - weathered brown buff to grey clay till	182.79
Clay Till - grey clay till - occasional small angular shale clast	178.52
Clay Till - grey clay till - abundant small angular shale & limestone clasts - minor sand	167.55
- thin gravelly layer	137.07
Clay Till - dark grey clay till - occasional boulders	136.16
- abundant gravel sized shale & limestone clasts	127.77
Fresh Water Aquifer	123.81
Kettle Point Shale	123.66
- fractured surface	122.82


PIEZOMETER INSTALLATION
182.79 m AMSL
177.14
2 inch diameter PVC piezometer
Geoguard Airlift-Pump
128.59
125.99
123.09

APPENDIX E

Hydraulic Test Results of Fresh Water Aquifer

APPENDIX E1

Slug Tests
87-Series Wells

Fresh Water Aquifer

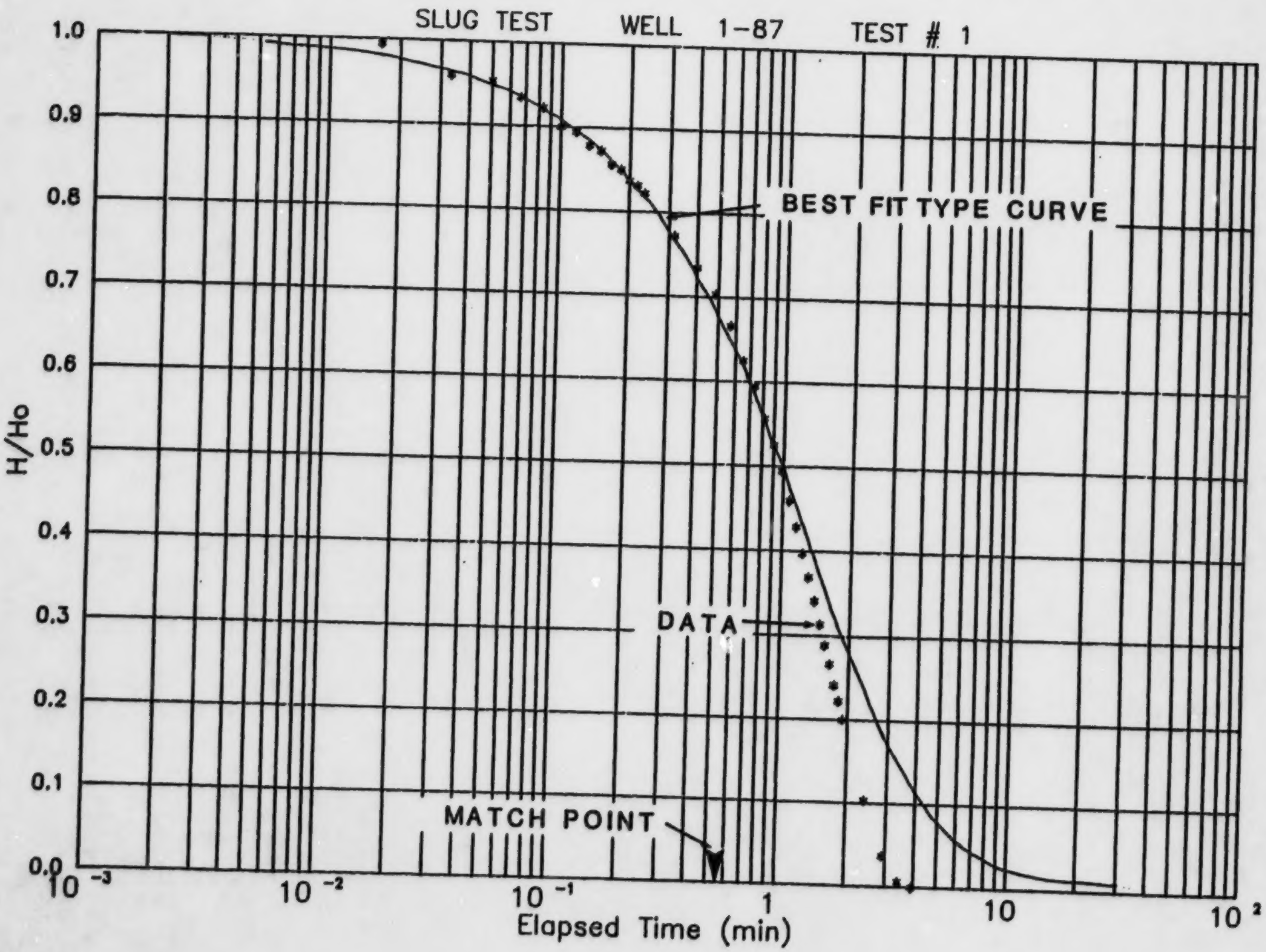
Summary Table and Type Curve Analyses

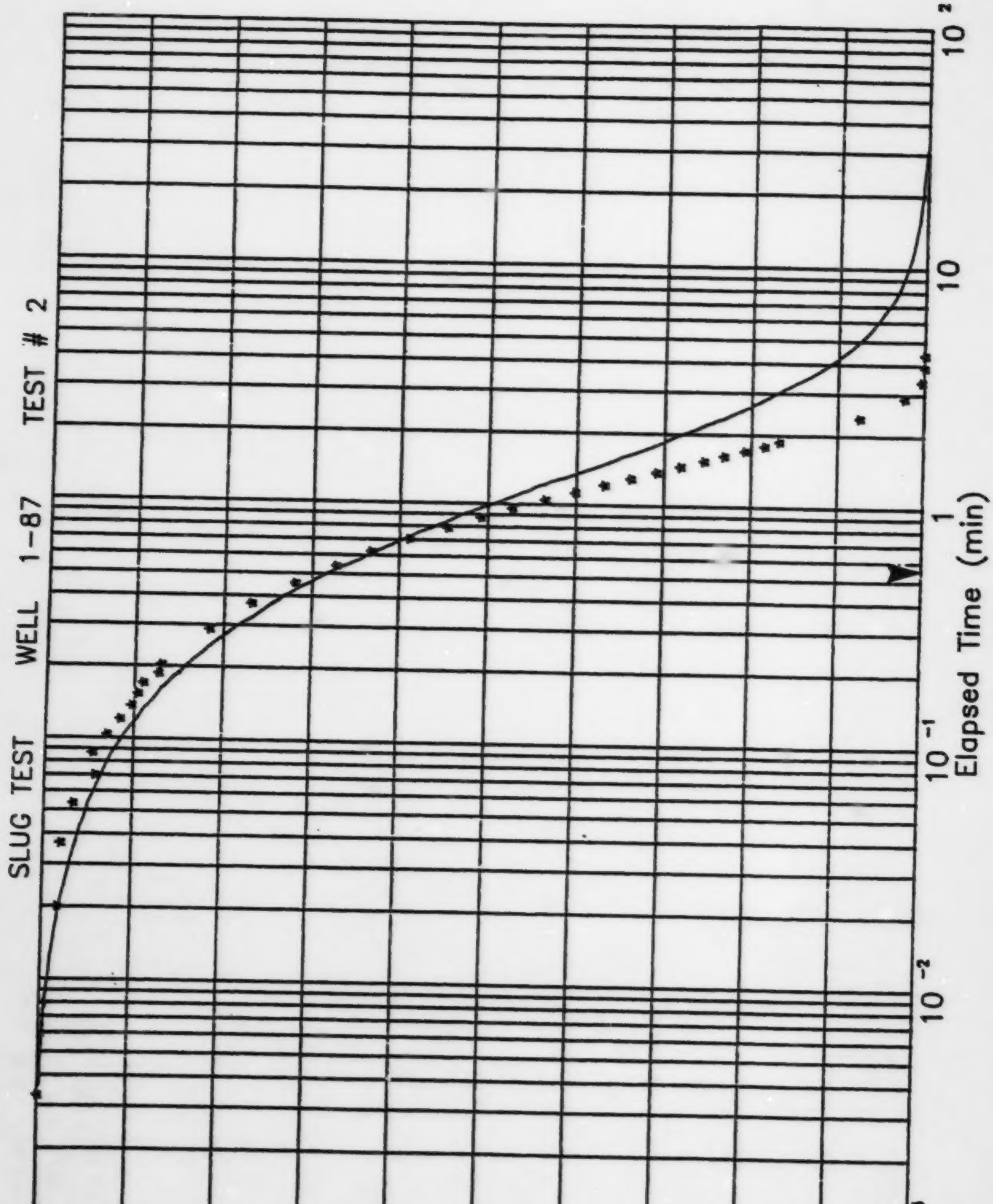
SUMMARY OF SLUG TESTS
FRESH WATER AQUIFER

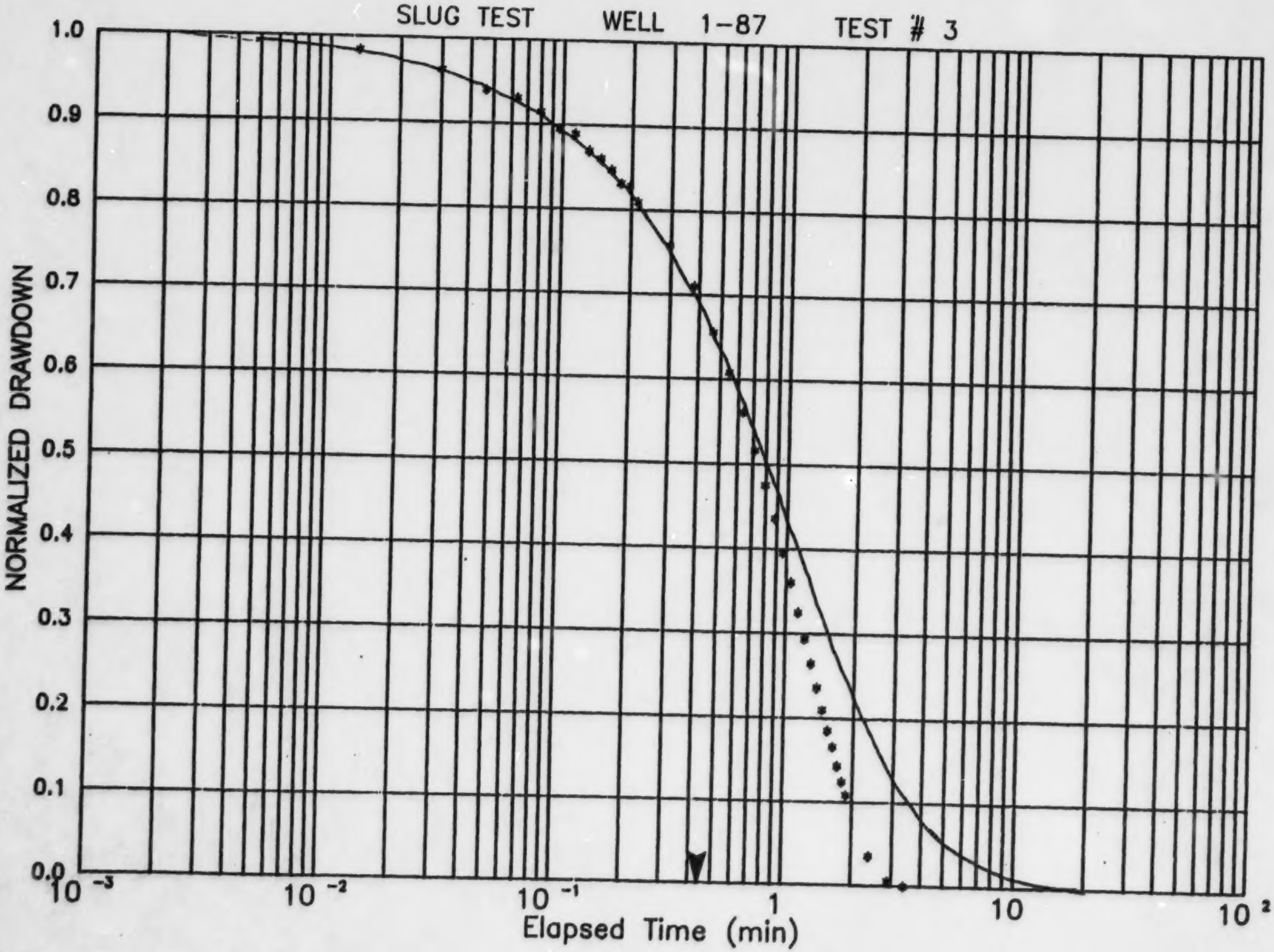
		Match point parameters			Calculated parameters		
Well #	Test #	Beta	t (sec)	Alpha	*Trans-missivity (m**2/s)	**Hydraulic Conductivity (m/s)	Comments
1-87	1	1.0	34.20	1.0E-04	1.9E-05	9.4E-06	
	2	1.0	34.20	1.0E-04	1.9E-05	9.4E-06	
	3	1.0	26.40	1.0E-04	2.4E-05	1.2E-05	
	4	1.0	28.80	1.0E-04	2.2E-05	1.1E-05	
2-87	1	1.0	17.40	1.0E-06	3.7E-05	1.9E-05	
	2	1.0	19.20	1.0E-06	3.4E-05	1.7E-05	
	3	1.0	18.00	1.0E-05	3.6E-05	1.8E-05	
3-87	1	1.0	NA	NA	NA	NA	Gas
4-87	1	1.0	1.80	1.0E-06	3.6E-04	1.8E-04	
	2	1.0	1.68	1.0E-06	3.8E-04	1.9E-04	
	3	1.0	1.38	1.0E-06	4.7E-04	2.3E-04	
5-87	1	1.0	26.40	1.0E-03	2.4E-05	1.2E-05	Gas
	2	1.0	16.80	1.0E-04	3.8E-05	1.9E-05	
	3	1.0	15.00	1.0E-04	4.3E-05	2.2E-05	
	4	1.0	11.40	1.0E-04	5.7E-05	2.8E-05	
6-87	1	1.0	13.80	1.0E-04	4.7E-05	2.3E-05	
	2	1.0	13.80	1.0E-04	4.7E-05	2.3E-05	
	3	1.0	14.40	1.0E-04	4.5E-05	2.2E-05	
	4	1.0	17.40	1.0E-03	3.7E-05	1.9E-05	
7-87	1	1.0	NA	NA	NA	NA	
8-87	1	1.0	56.40	1.0E-01	1.1E-05	5.7E-06	
	2	1.0	NA	NA	NA	NA	Gas
	3	1.0	NA	NA	NA	NA	Gas
9-87	1	1.0	198.00	1.0E-02	3.3E-06	1.6E-06	
10-87	1	1.0	18.00	1.0E-07	3.6E-05	1.8E-05	
	2	1.0	9.00	1.0E-08	7.2E-05	3.6E-05	
	3	1.0	9.00	1.0E-08	7.2E-05	3.6E-05	
	4	1.0	8.40	1.0E-08	7.7E-05	3.8E-05	
11-87	1	1.0	21.60	1.0E-05	3.0E-05	1.5E-05	
	2	1.0	22.20	1.0E-05	2.9E-05	1.5E-05	
	3	1.0	19.80	1.0E-05	3.3E-05	1.6E-05	
	4	1.0	20.40	1.0E-05	3.2E-05	1.6E-05	
12-87	1	1.0	NA	NA	NA	NA	
13-87	1	1.0	5.34	1.0E-05	1.2E-04	6.0E-05	
	2	1.0	4.68	1.0E-05	1.4E-04	6.9E-05	
	3	1.0	4.56	1.0E-05	1.4E-04	7.1E-05	
	4	1.0	4.38	1.0E-05	1.5E-04	7.4E-05	
14-87	1	1.0	22.20	1.0E-03	2.9E-05	1.5E-05	
	2	1.0	16.20	1.0E-05	4.0E-05	2.0E-05	
	3	1.0	16.80	1.0E-05	3.8E-05	1.9E-05	
	4	1.0	15.00	1.0E-05	4.3E-05	2.2E-05	
15-87	1	1.0	10.80	1.0E-04	6.0E-05	3.0E-05	
	2	1.0	10.20	1.0E-04	6.3E-05	3.2E-05	
	3	1.0	10.80	1.0E-04	6.0E-05	3.0E-05	
	4	1.0	10.20	1.0E-04	6.3E-05	3.2E-05	

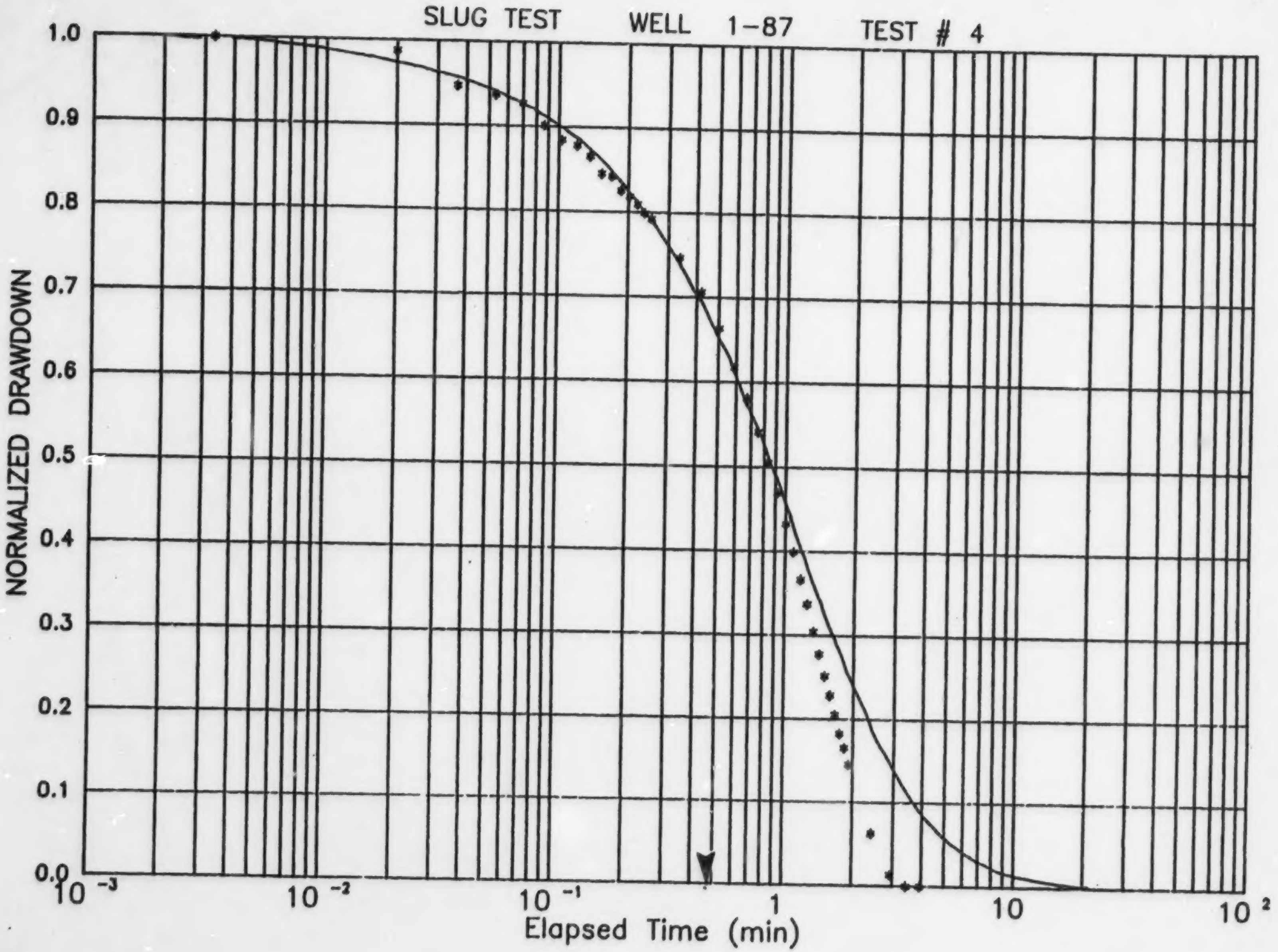
* Determined from T = Beta * rc**2 / t
where rc = 0.025 m.

** Determined assuming formation thickness of 2 m.

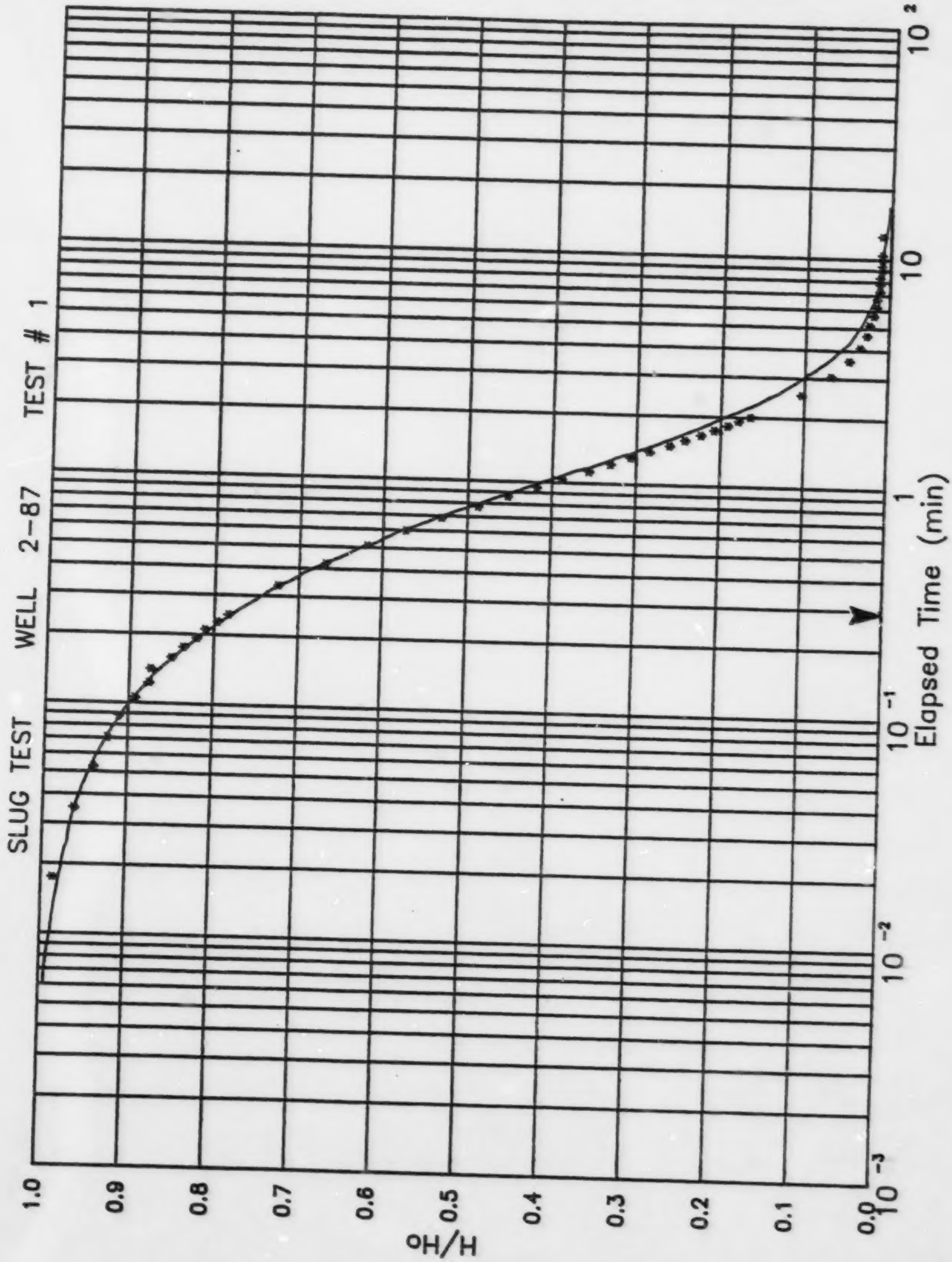

SLUG TEST WELL 1-87 TEST # 1
H/Ho
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 -3
10 -2
10 -1
1
10
10 2
Elapsed Time (min)
BEST FIT TYPE CURVE
DATA
MATCH POINT


SLUG TEST WELL 1-87 TEST # 2
H/Ho
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

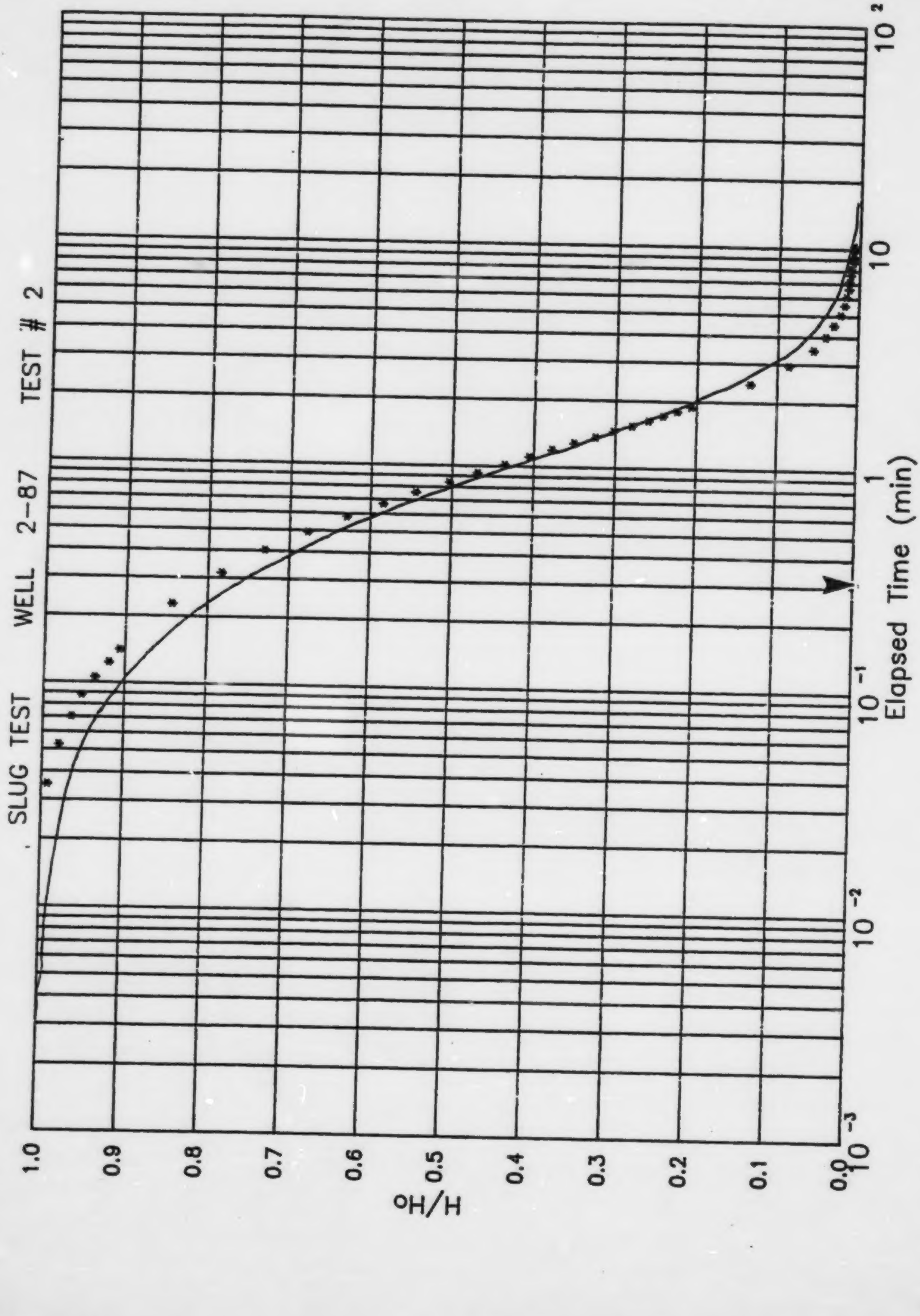

SLUG TEST WELL 1-87 TEST # 3
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

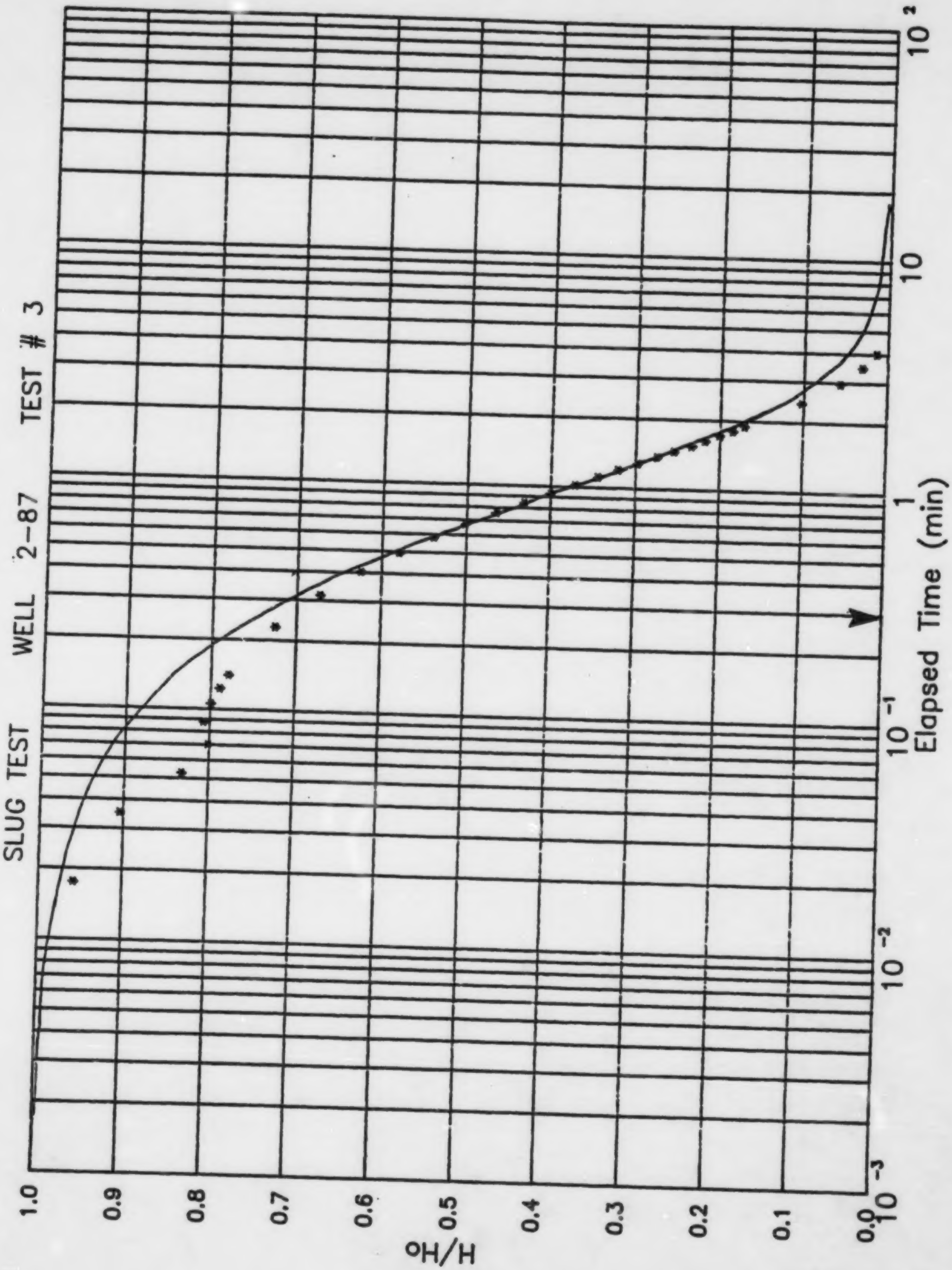


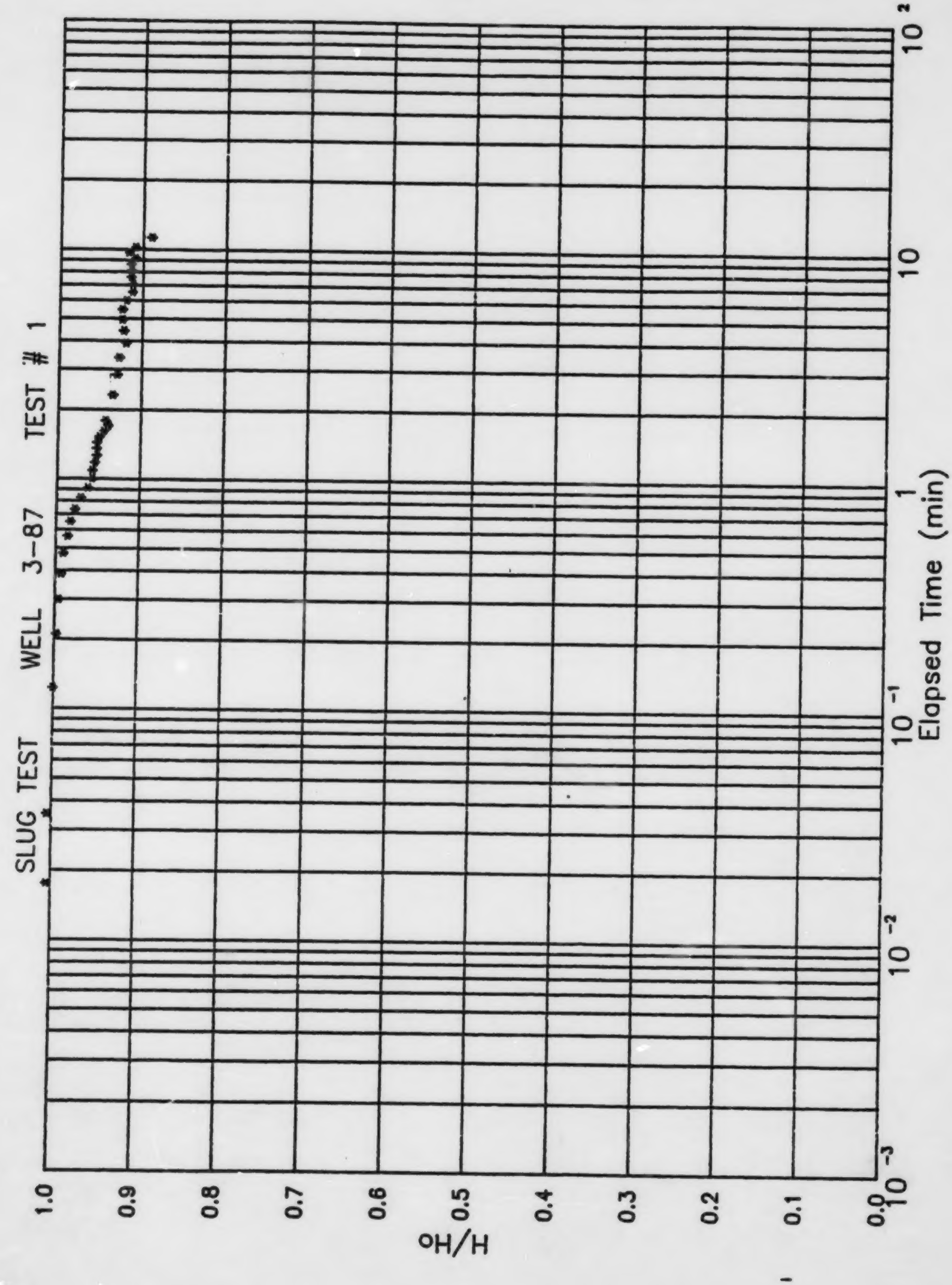
SLUG TEST WELL 1-87 TEST # 4

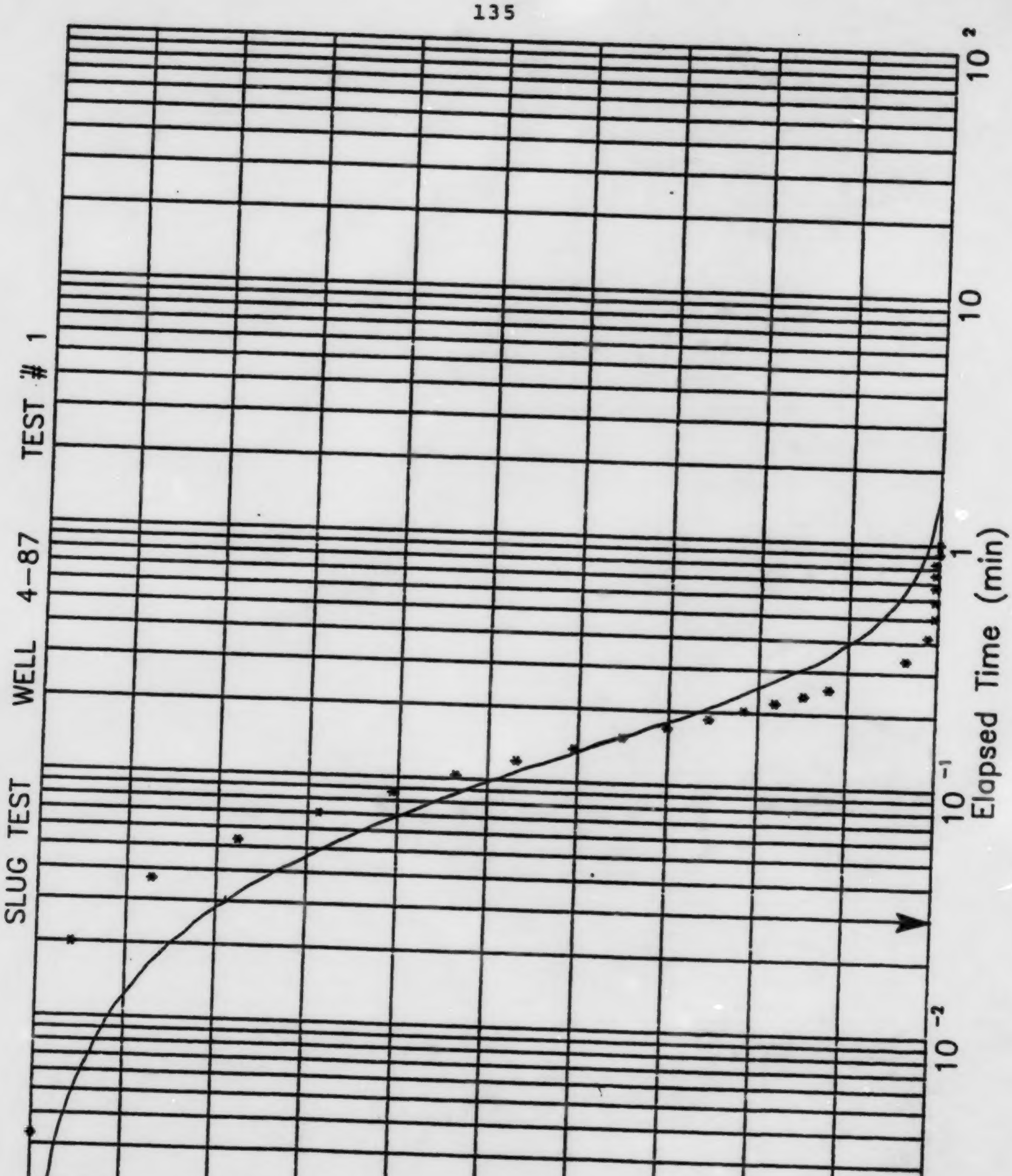


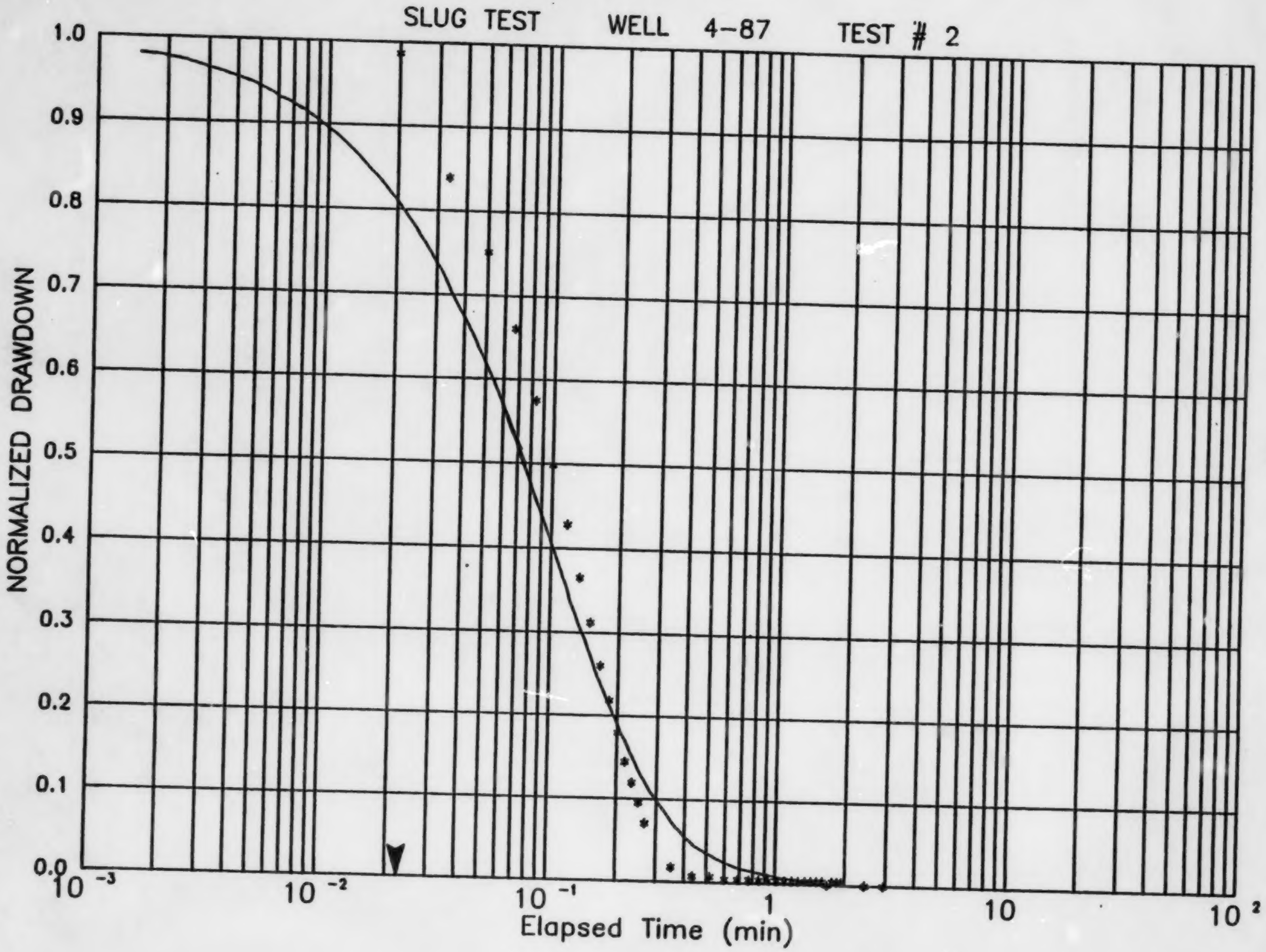
SLUG TEST WELL 2-87 TEST # 1


SLUG TEST WELL 2-87 TEST # 2
H/Ho
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

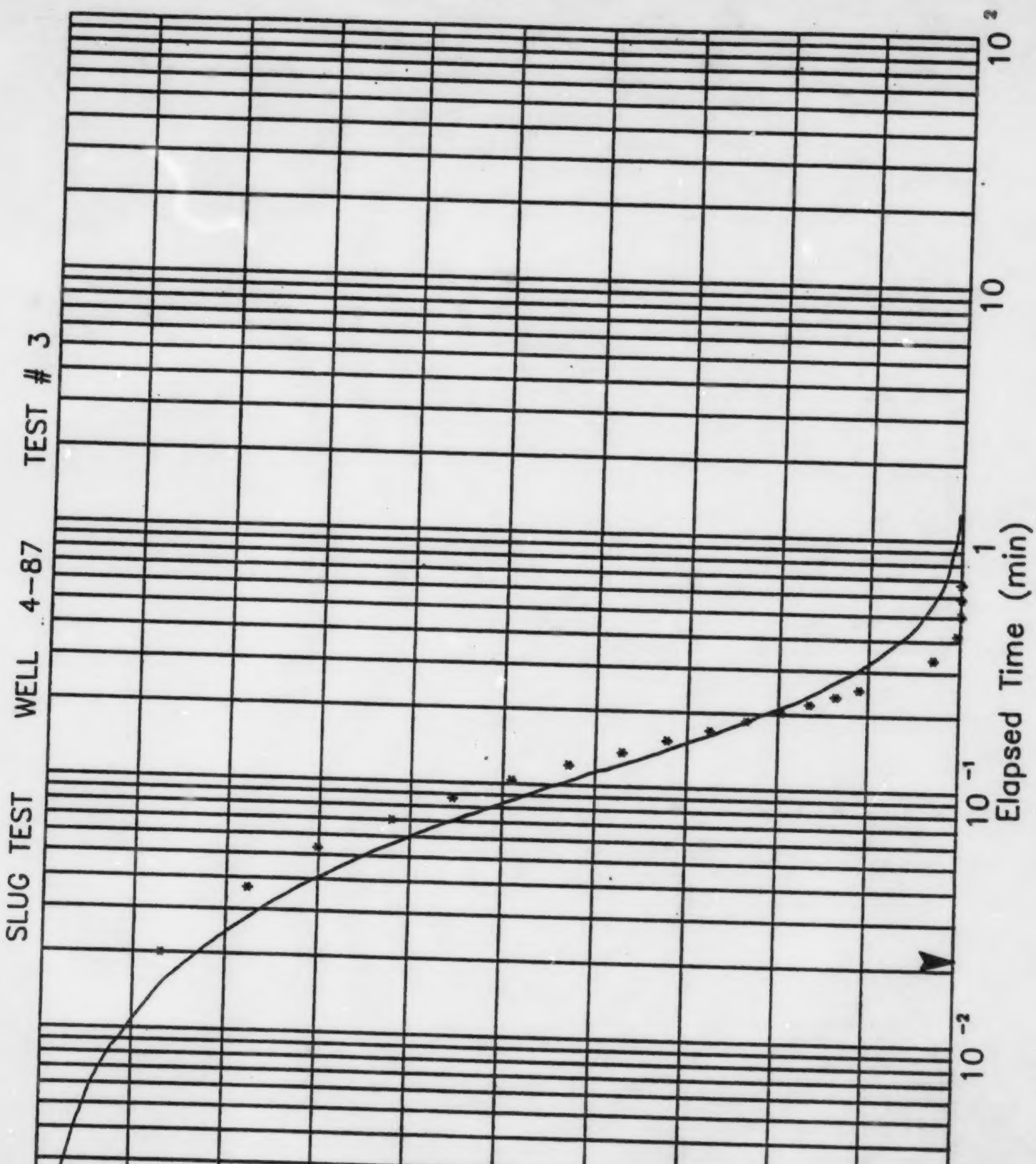

SLUG TEST WELL 2-87 TEST # 3
H/Ho
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)


SLUG TEST WELL 3-87 TEST # 1
H/Ho
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

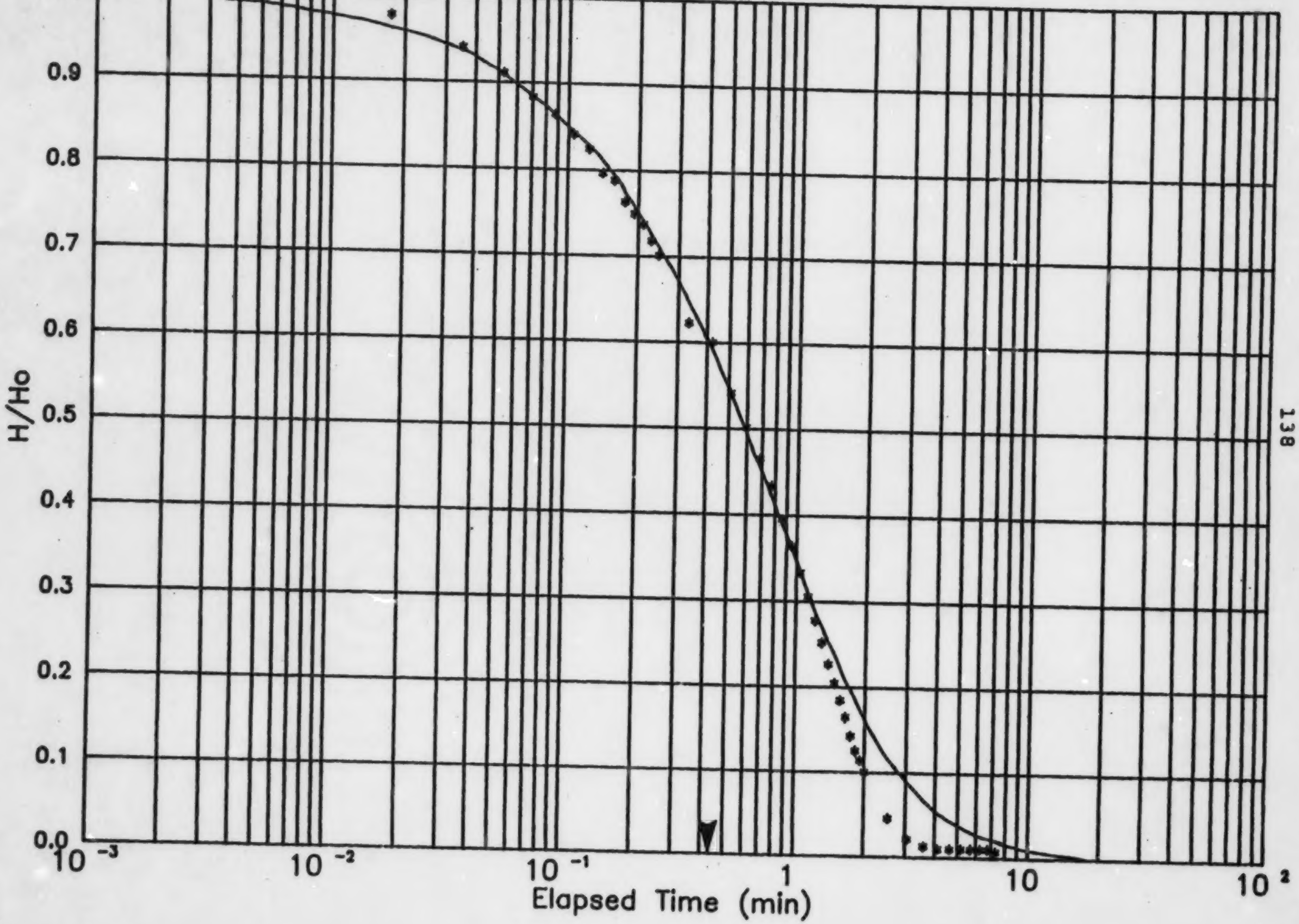

SLUG TEST WELL 4-87 TEST # 1
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

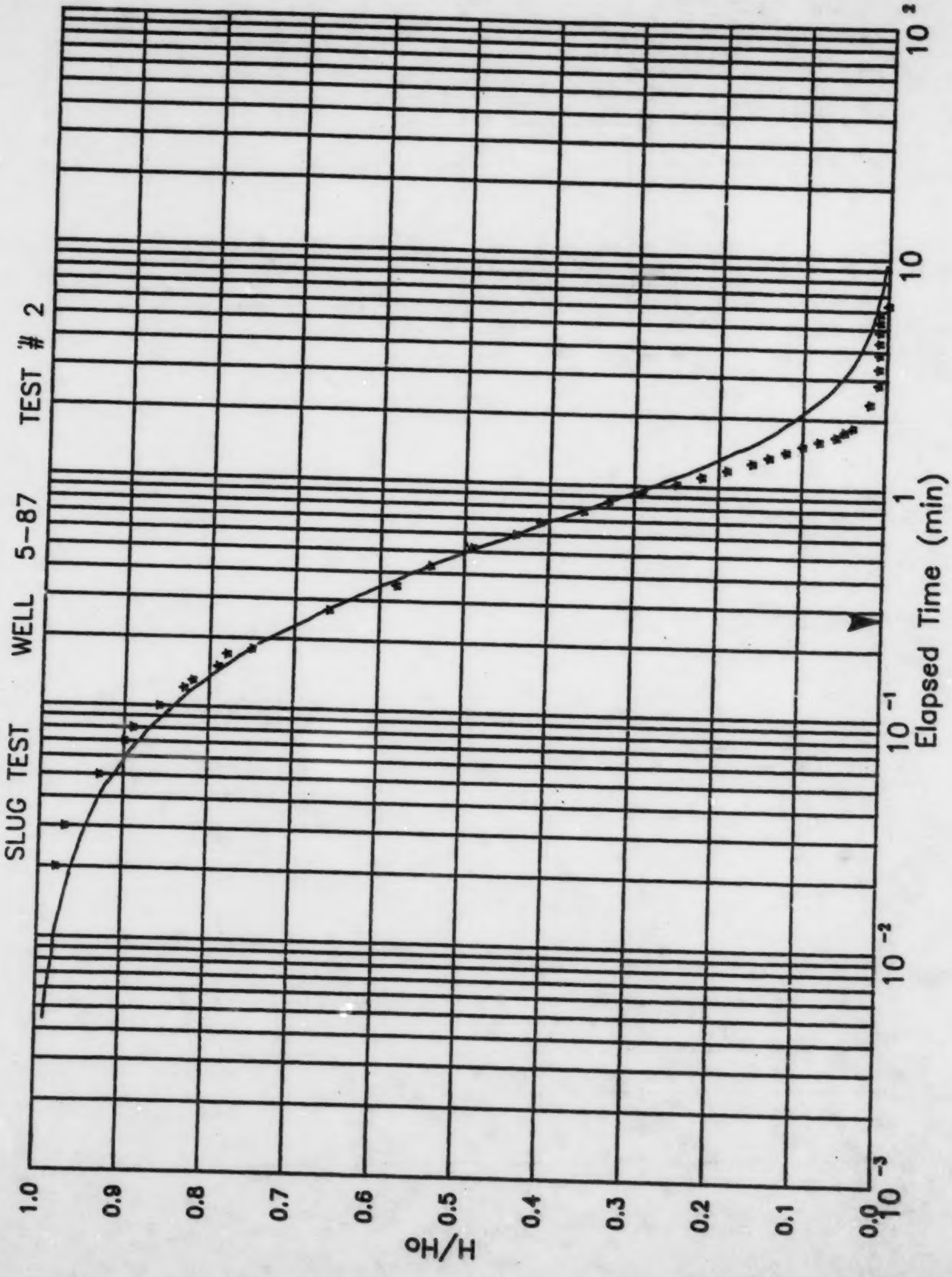


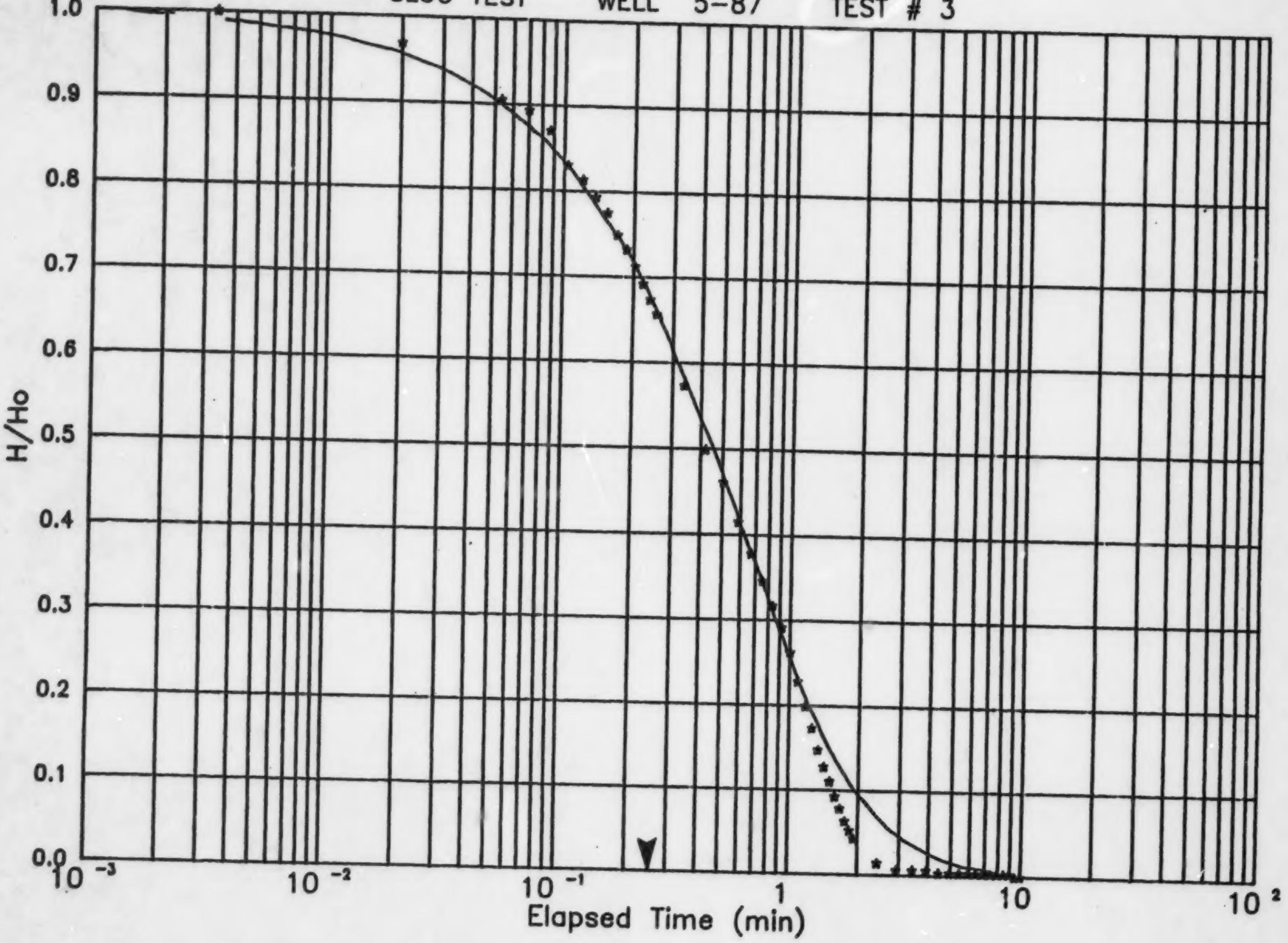
SLUG TEST WELL 4-87 TEST # 2


SLUG TEST WELL 4-87 TEST # 3
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Elapsed Time (min)
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}

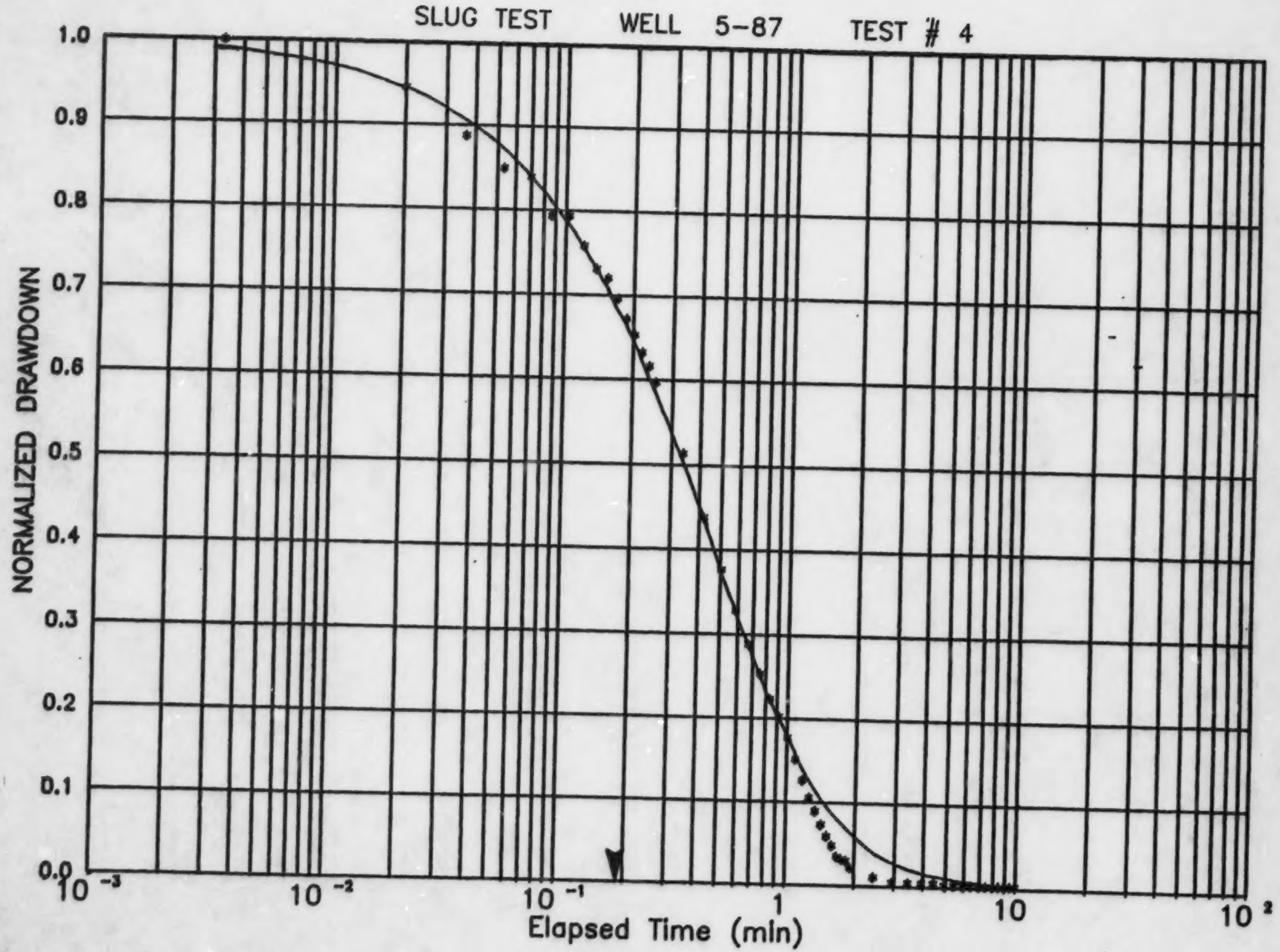
SLUG TEST WELL 5-87 TEST # 1

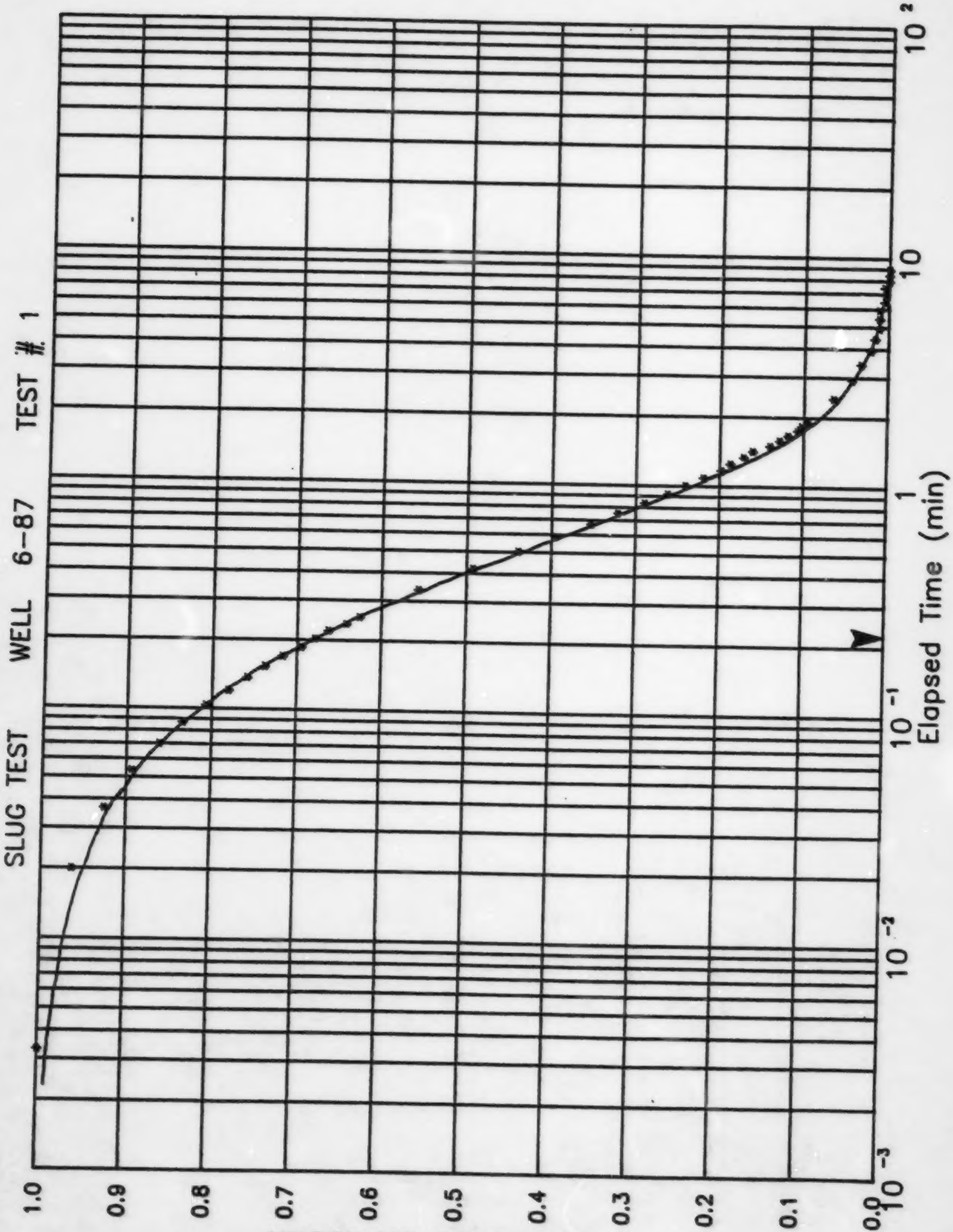


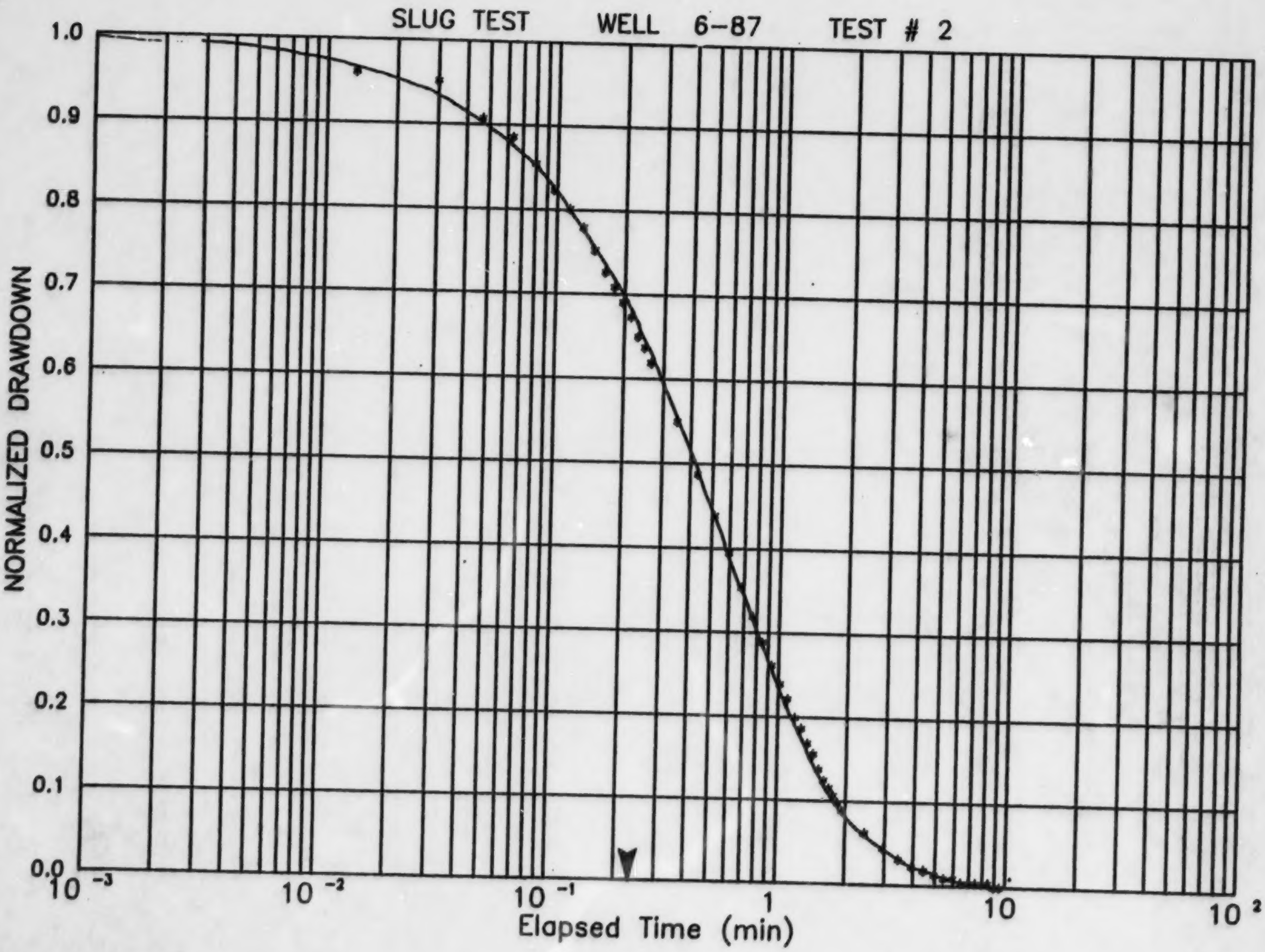

SLUG TEST WELL 5-87 TEST # 2
H/Ho
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^-3
10^-2
10^-1
1
10
10^2
Elapsed Time (min)

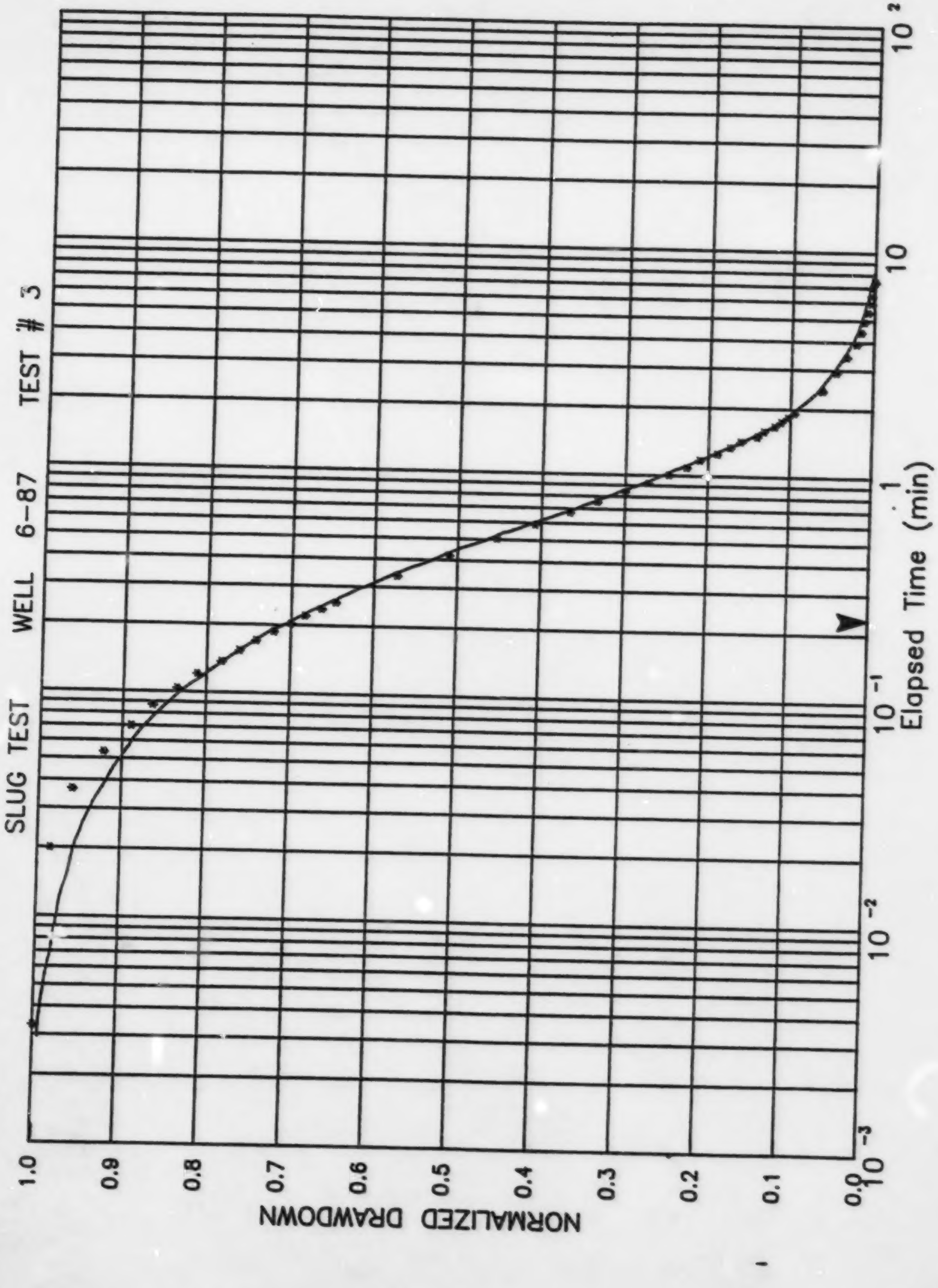


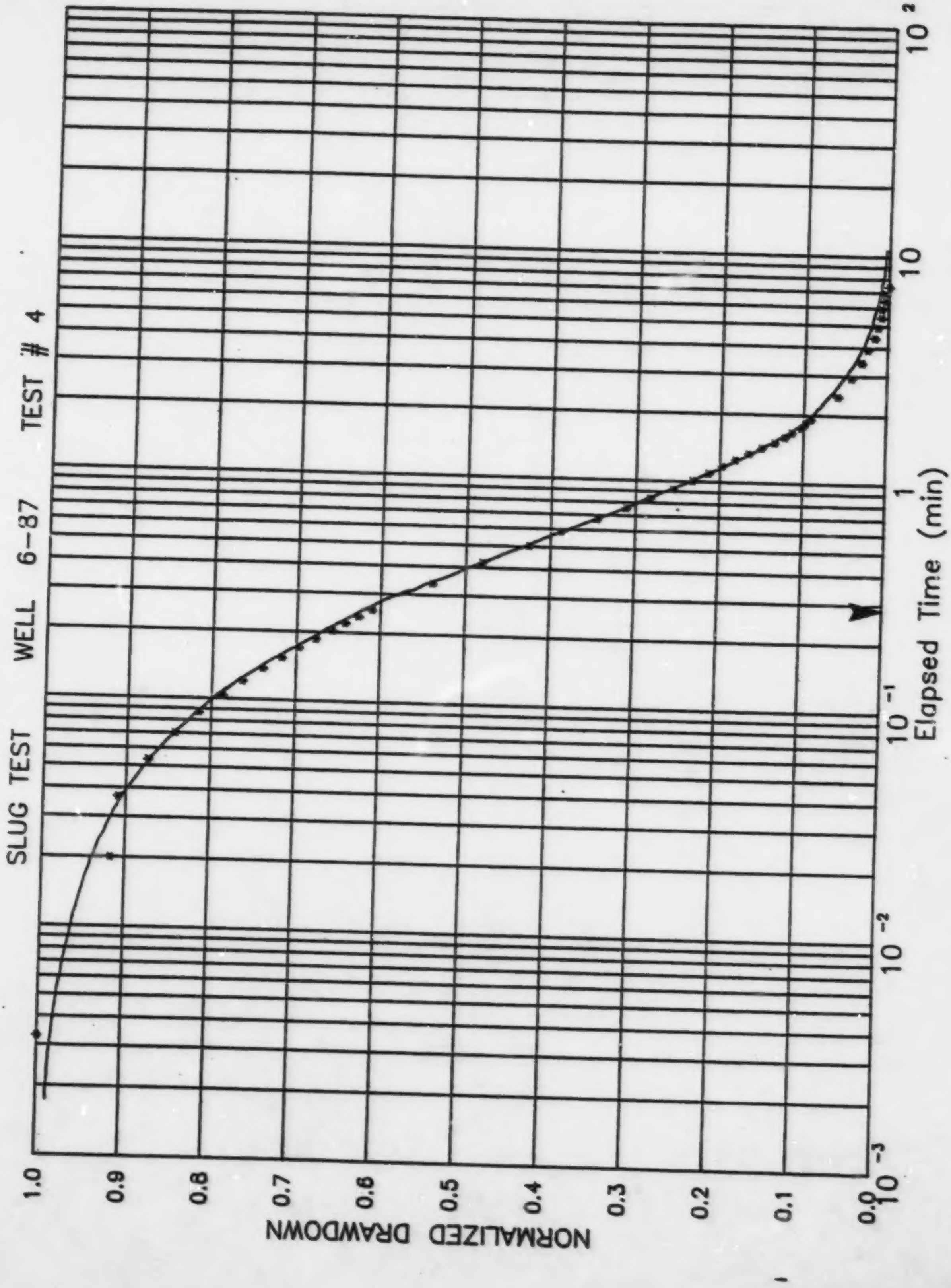
SLUG TEST WELL 5-87 TEST # 3

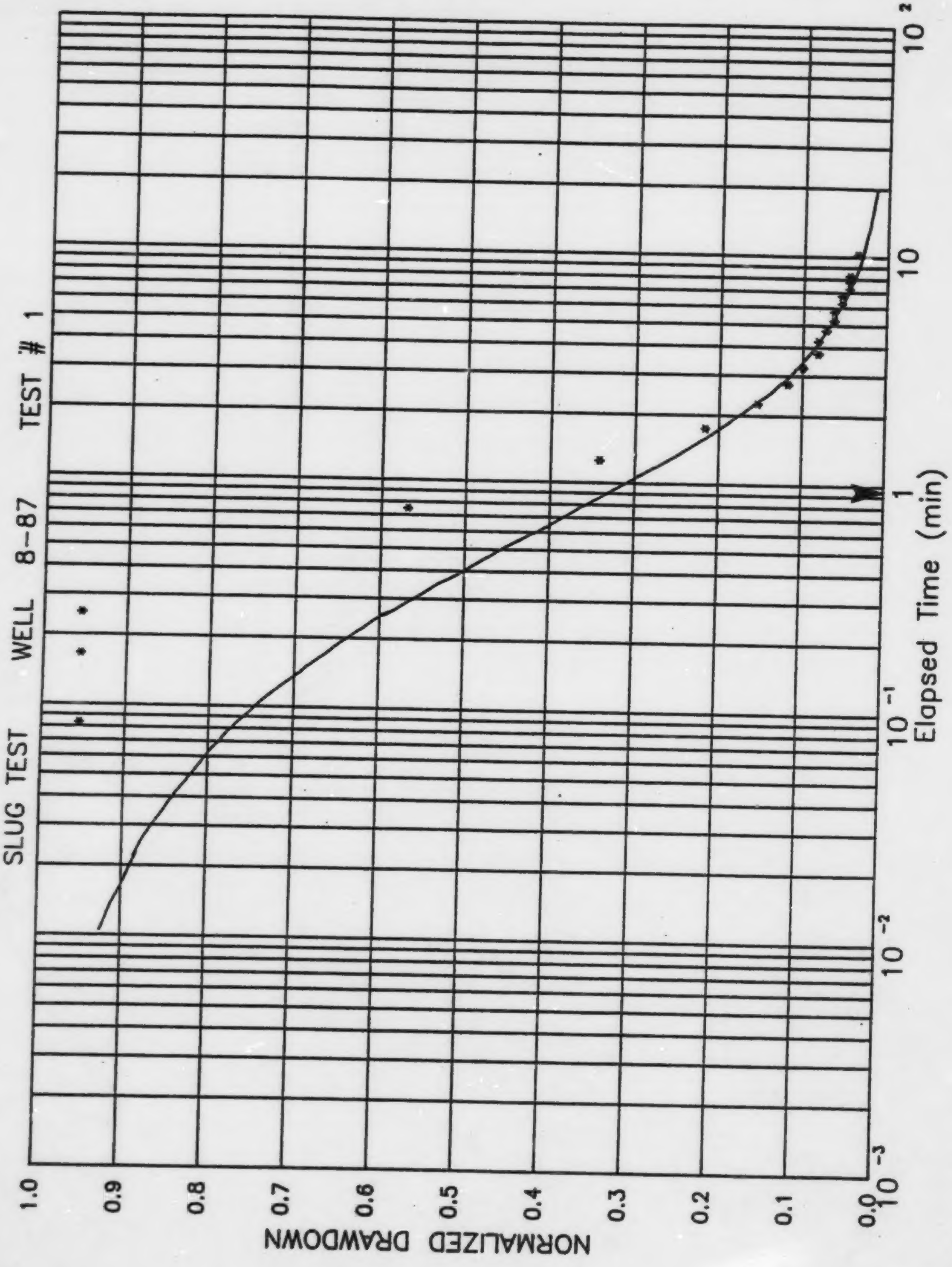

SLUG TEST WELL 5-87 TEST # 4
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 ⁻³
10 ⁻²
10 ⁻¹
1
10
10 ²
Elapsed Time (min)

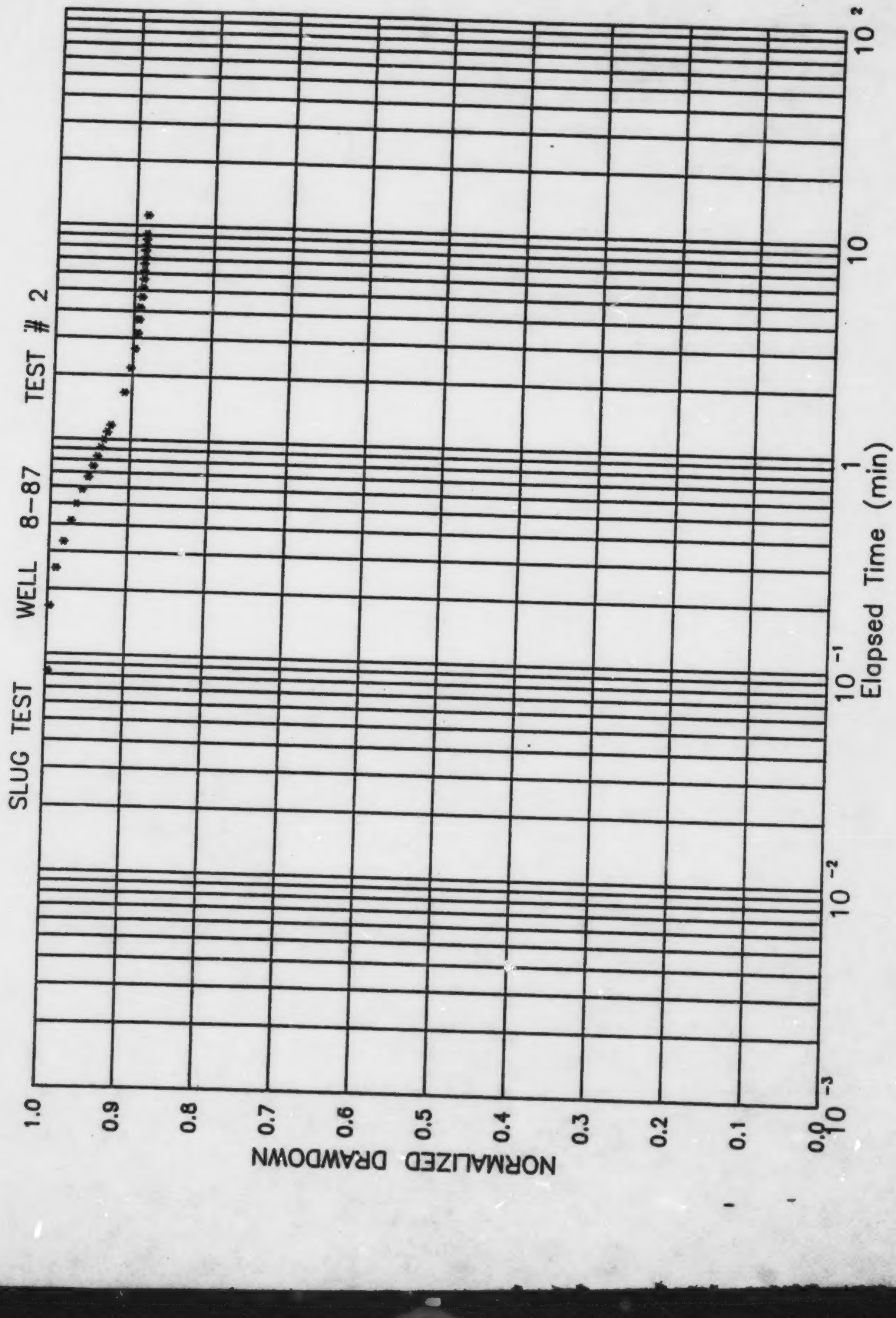

SLUG TEST WELL 6-87 TEST # 1
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Elapsed Time (min)
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}

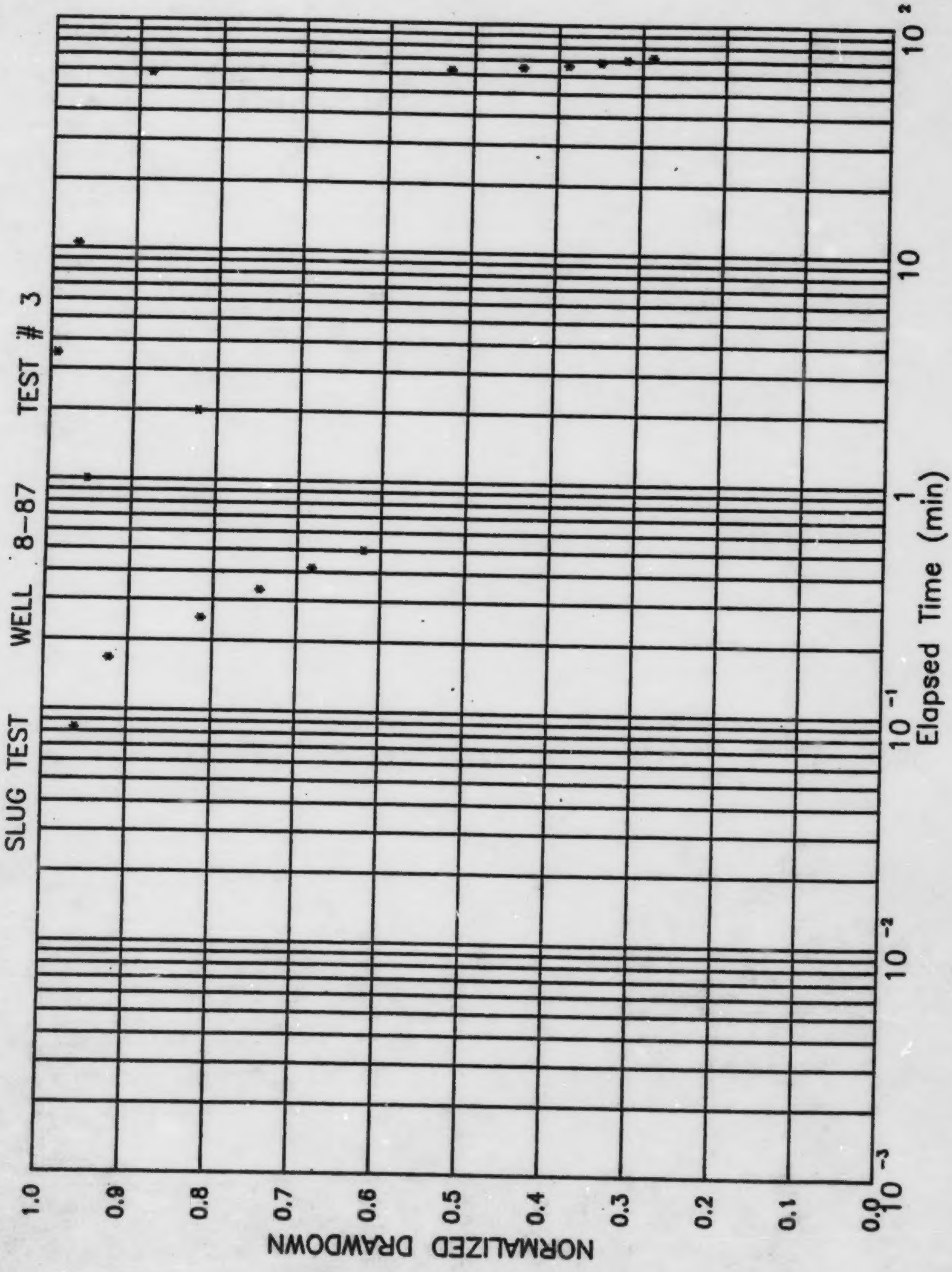

SLUG TEST WELL 6-87 TEST # 2
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

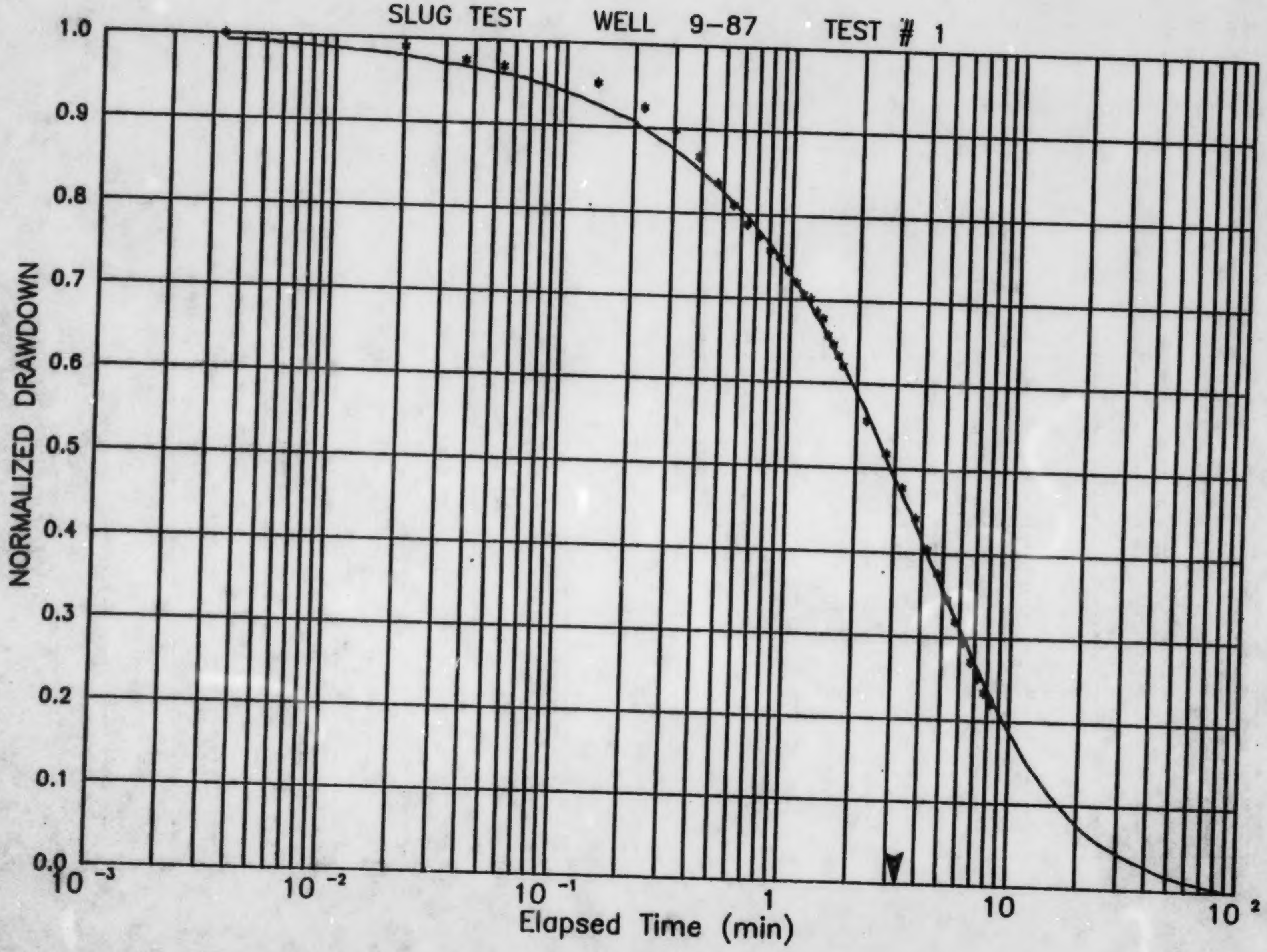

SLUG TEST WELL 6-87 TEST # 3
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

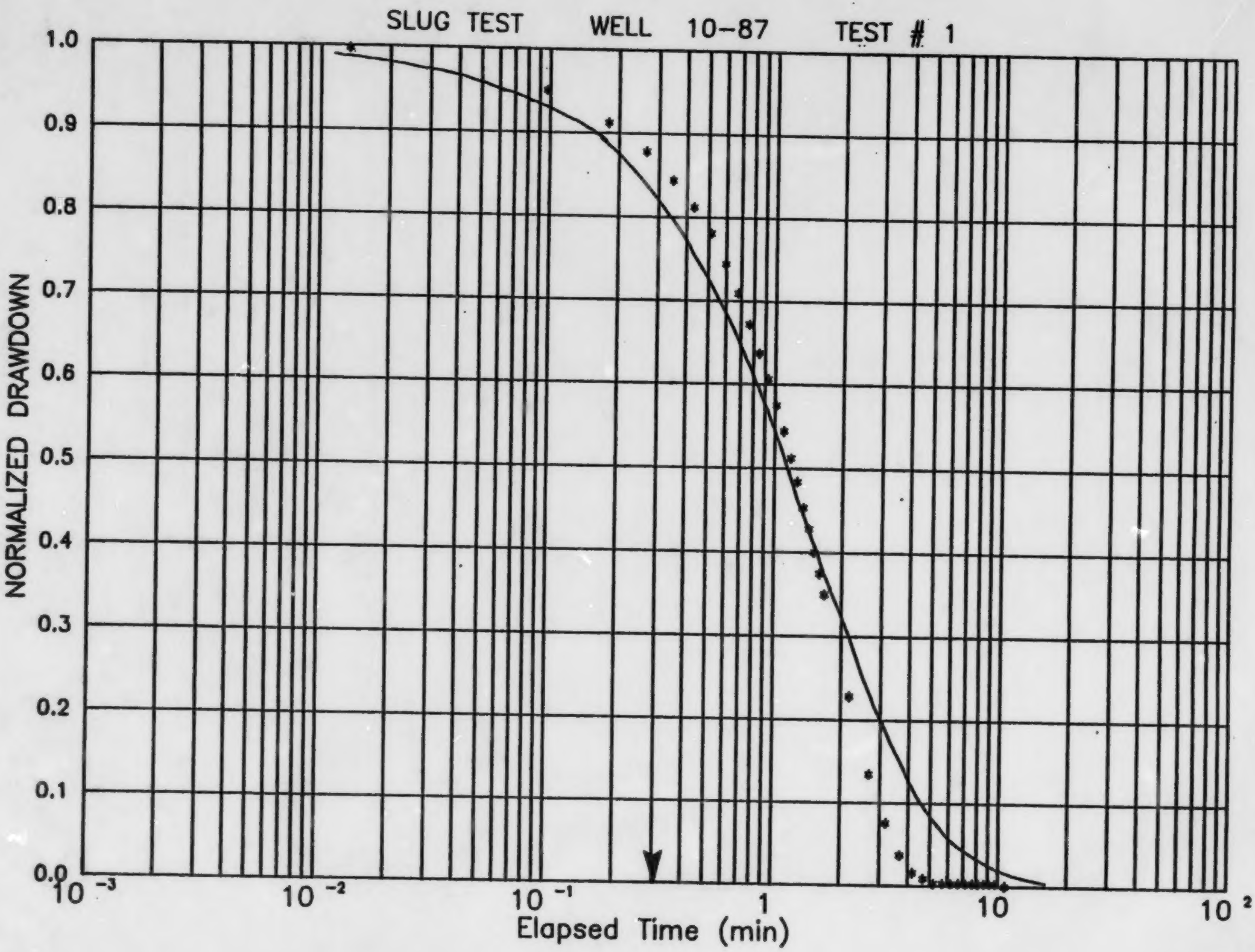

SLUG TEST WELL 6-87 TEST # 4
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

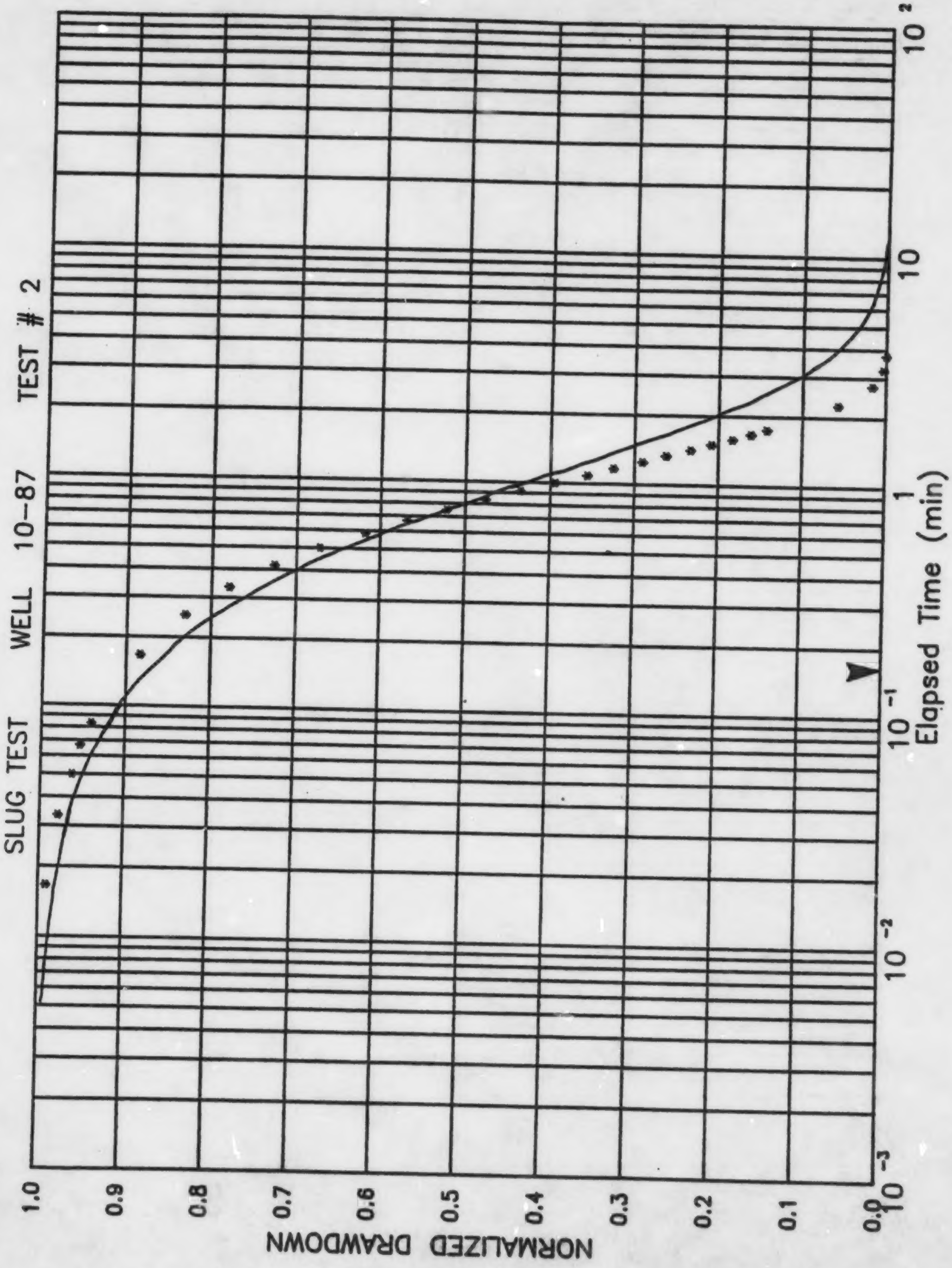

SLUG TEST WELL 8-87 TEST # 1
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)


SLUG TEST WELL 8-87 TEST # 2
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

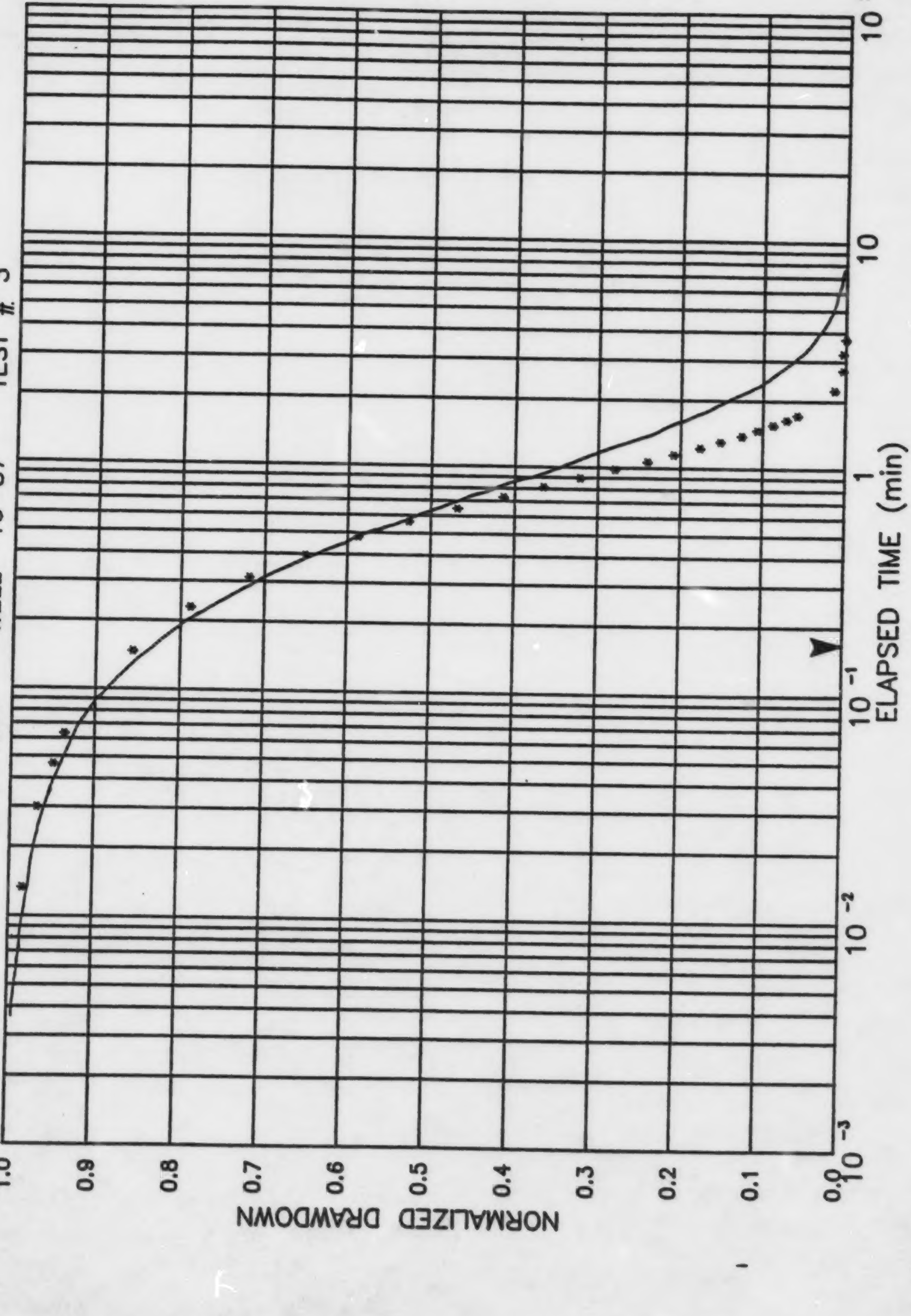

SLUG TEST WELL 8-87 TEST # 3
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

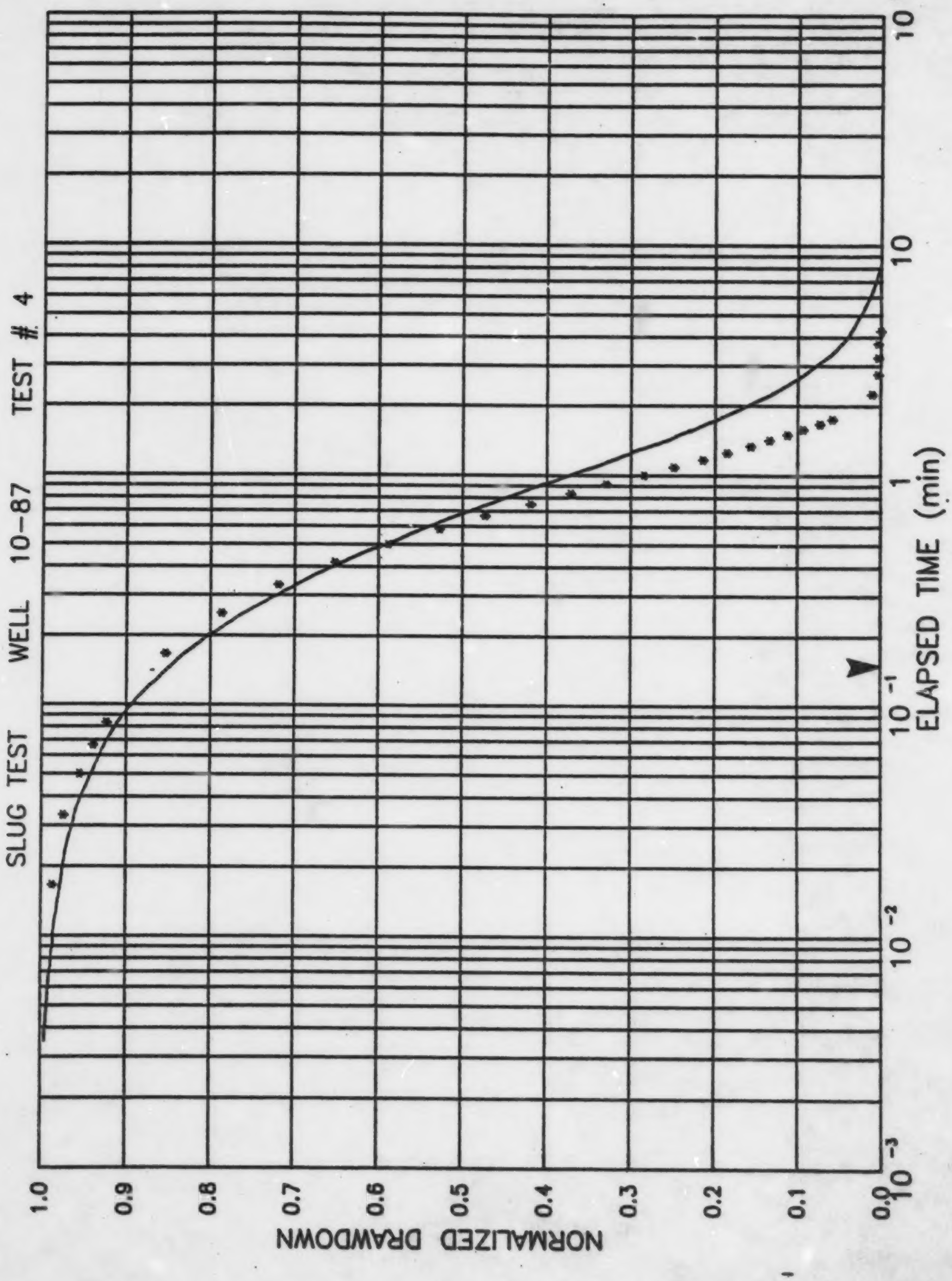

SLUG TEST WELL 9-87 TEST # 1
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

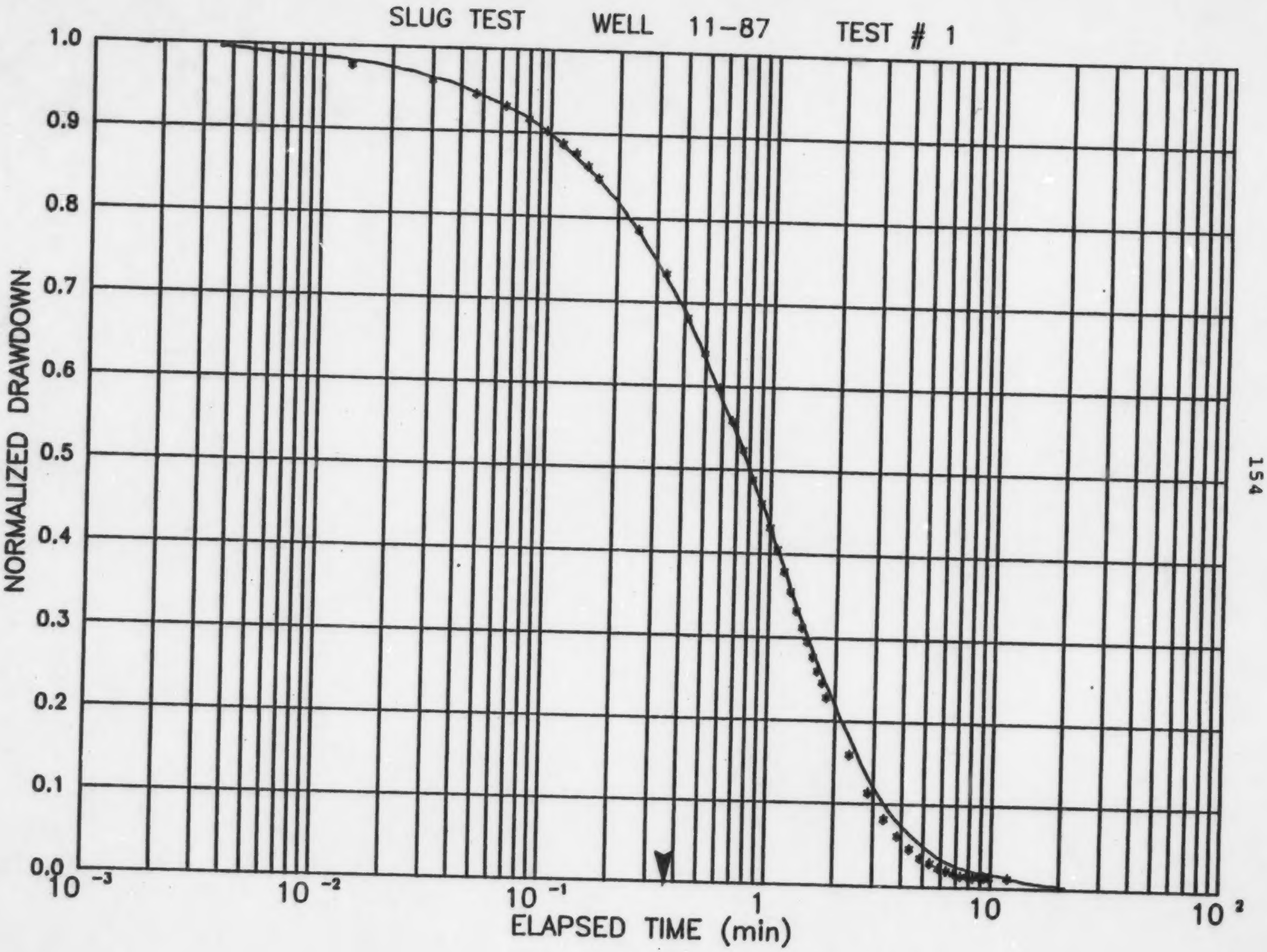

SLUG TEST WELL 10-87 TEST # 1
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

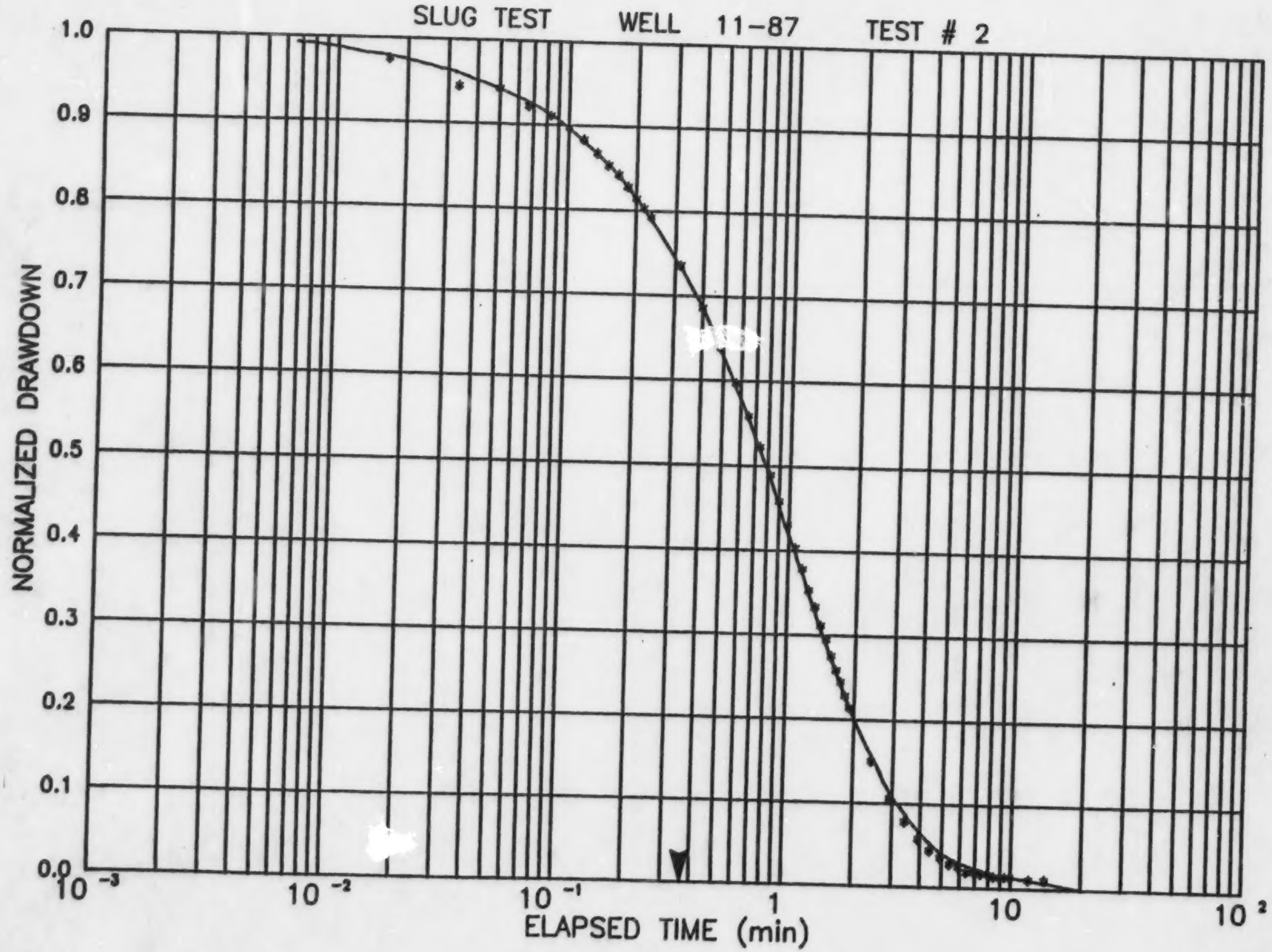

SLUG TEST WELL 10-87 TEST # 2
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
Elapsed Time (min)

SLUG TEST WELL 10-87 TEST # 3

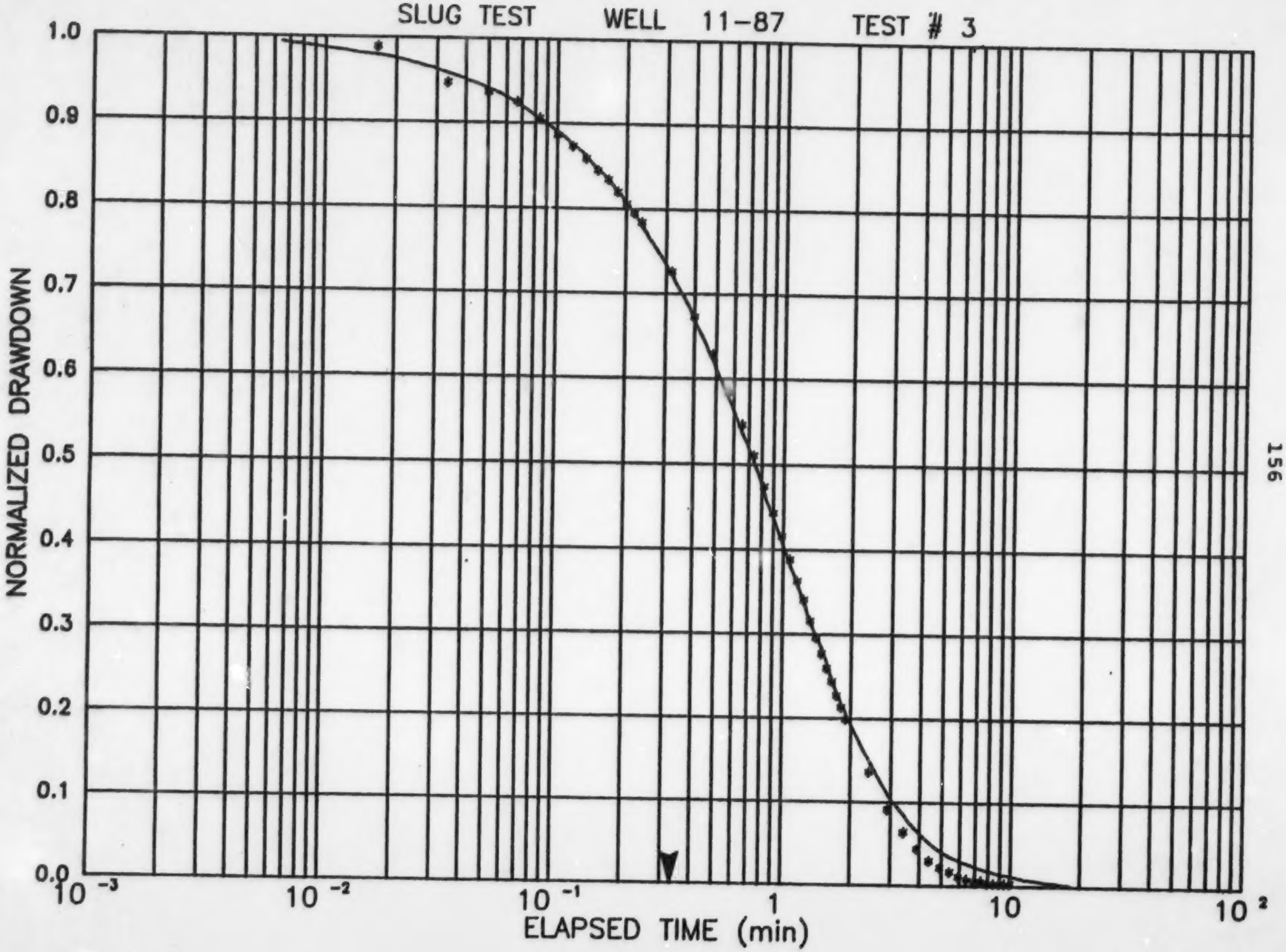


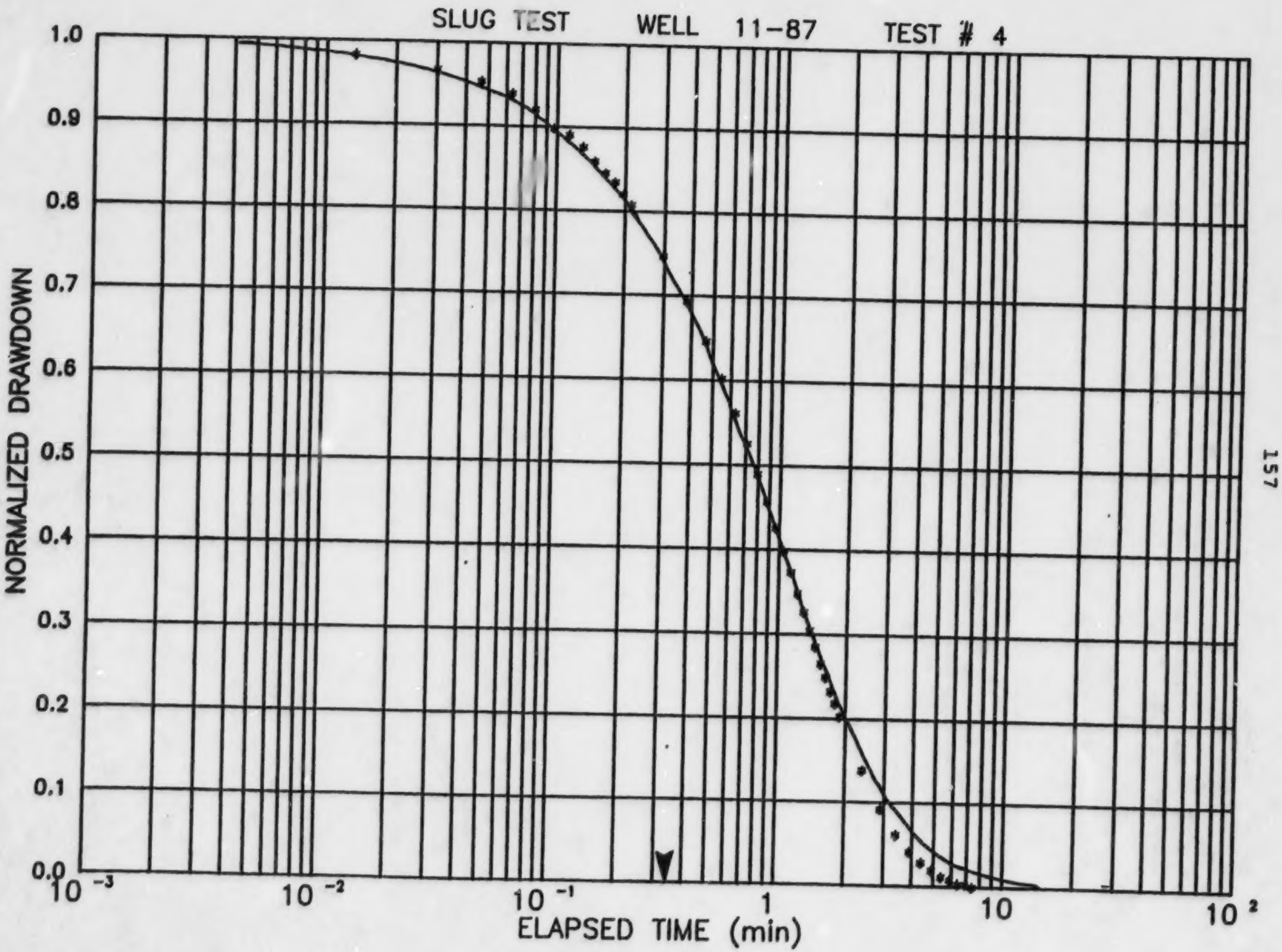

SLUG TEST WELL 10-87 TEST # 4
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (min)
10⁻³
10⁻²
10⁻¹
1
10
10²

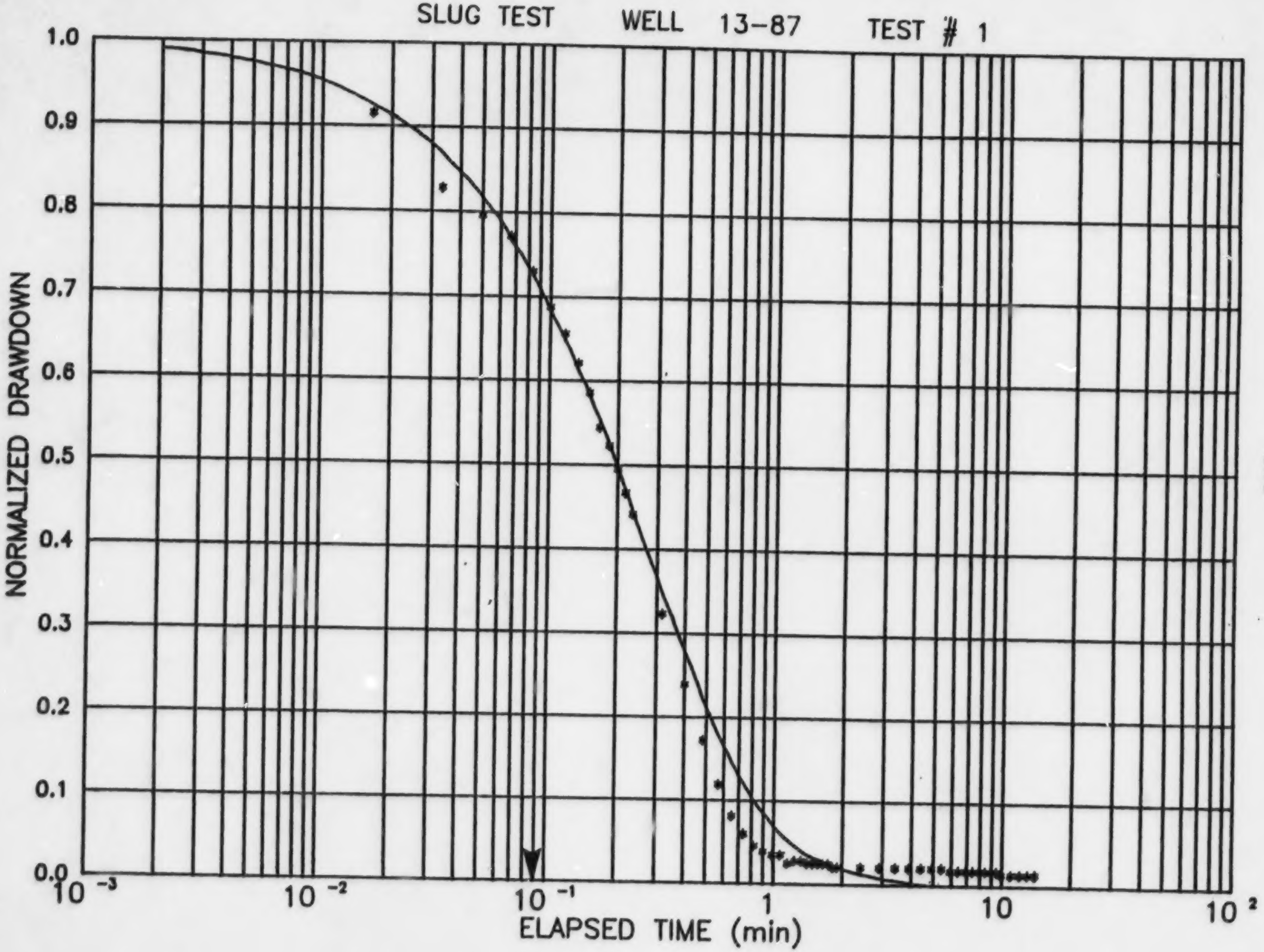

SLUG TEST WELL 11-87 TEST # 1
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
ELAPSED TIME (min)

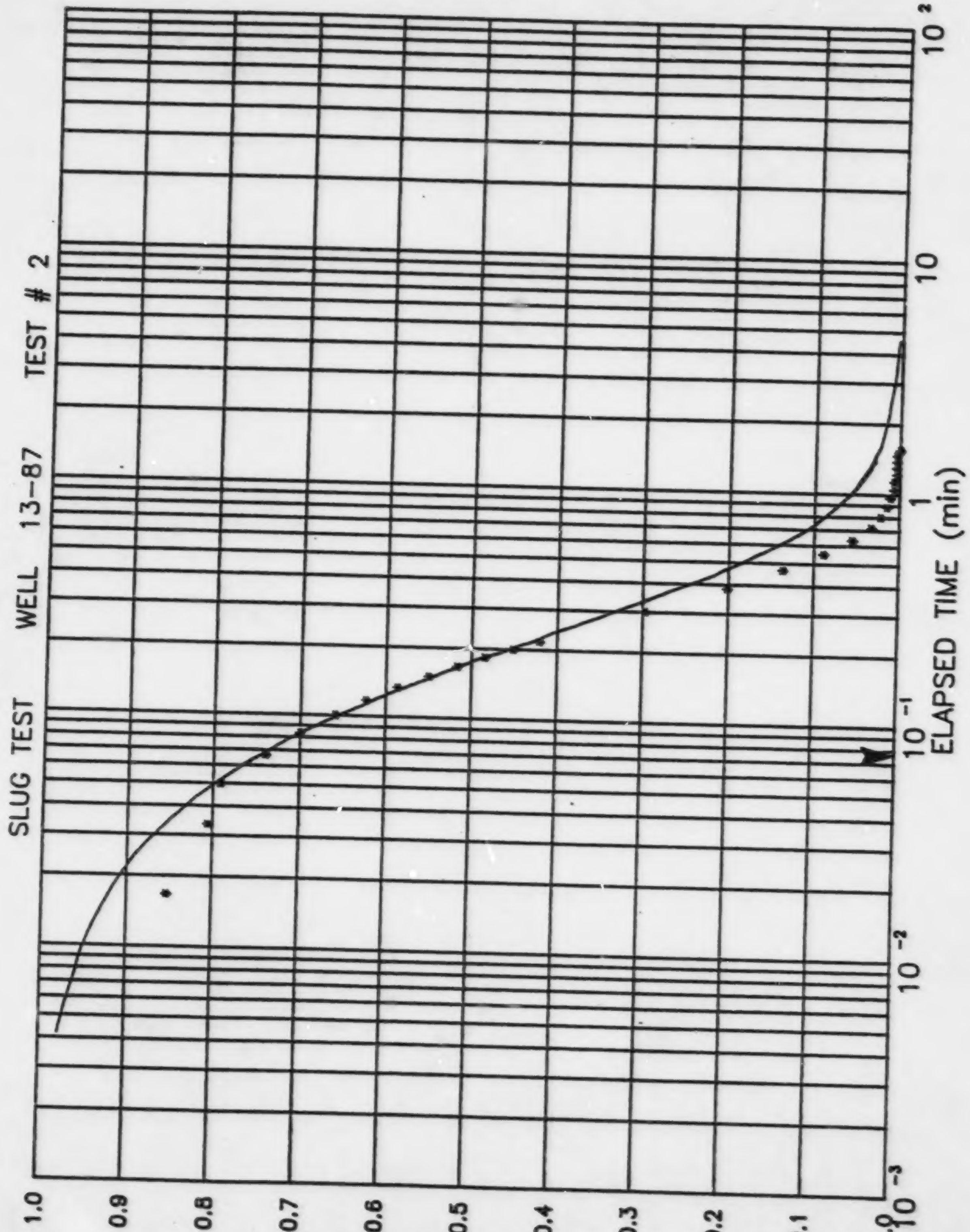


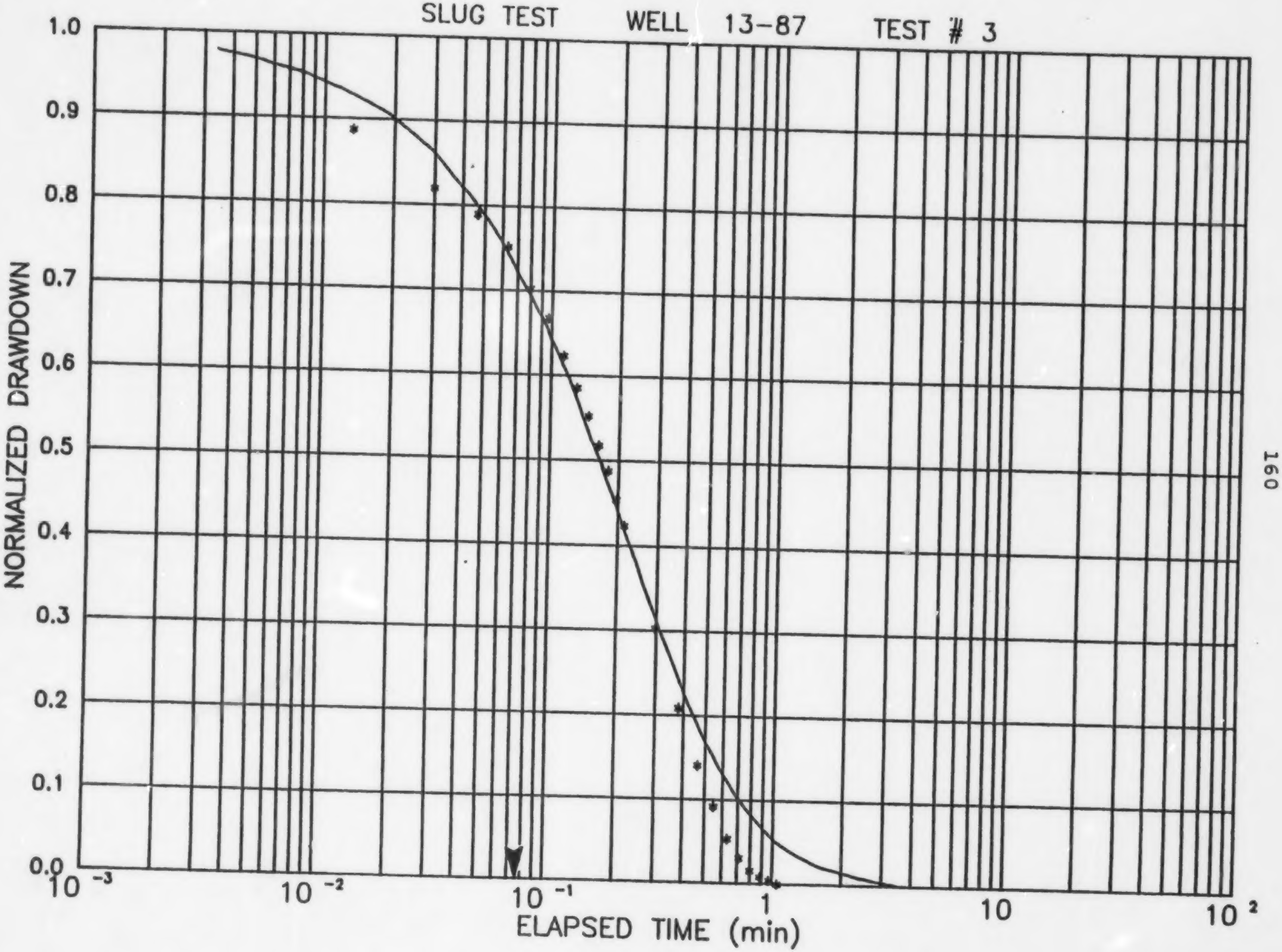
SLUG TEST WELL 11-87 TEST # 2

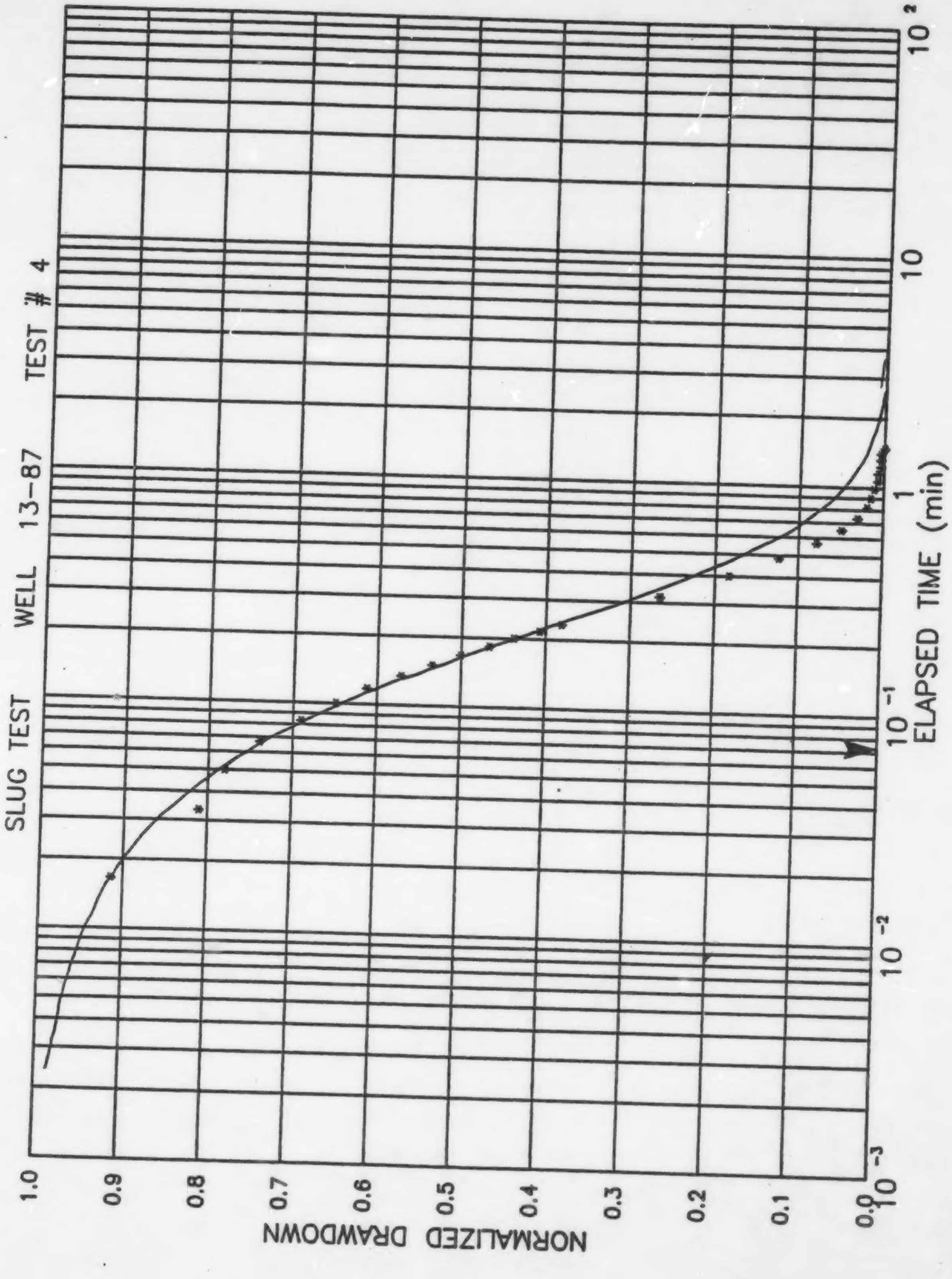

SLUG TEST WELL 11-87 TEST # 3
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
ELAPSED TIME (min)

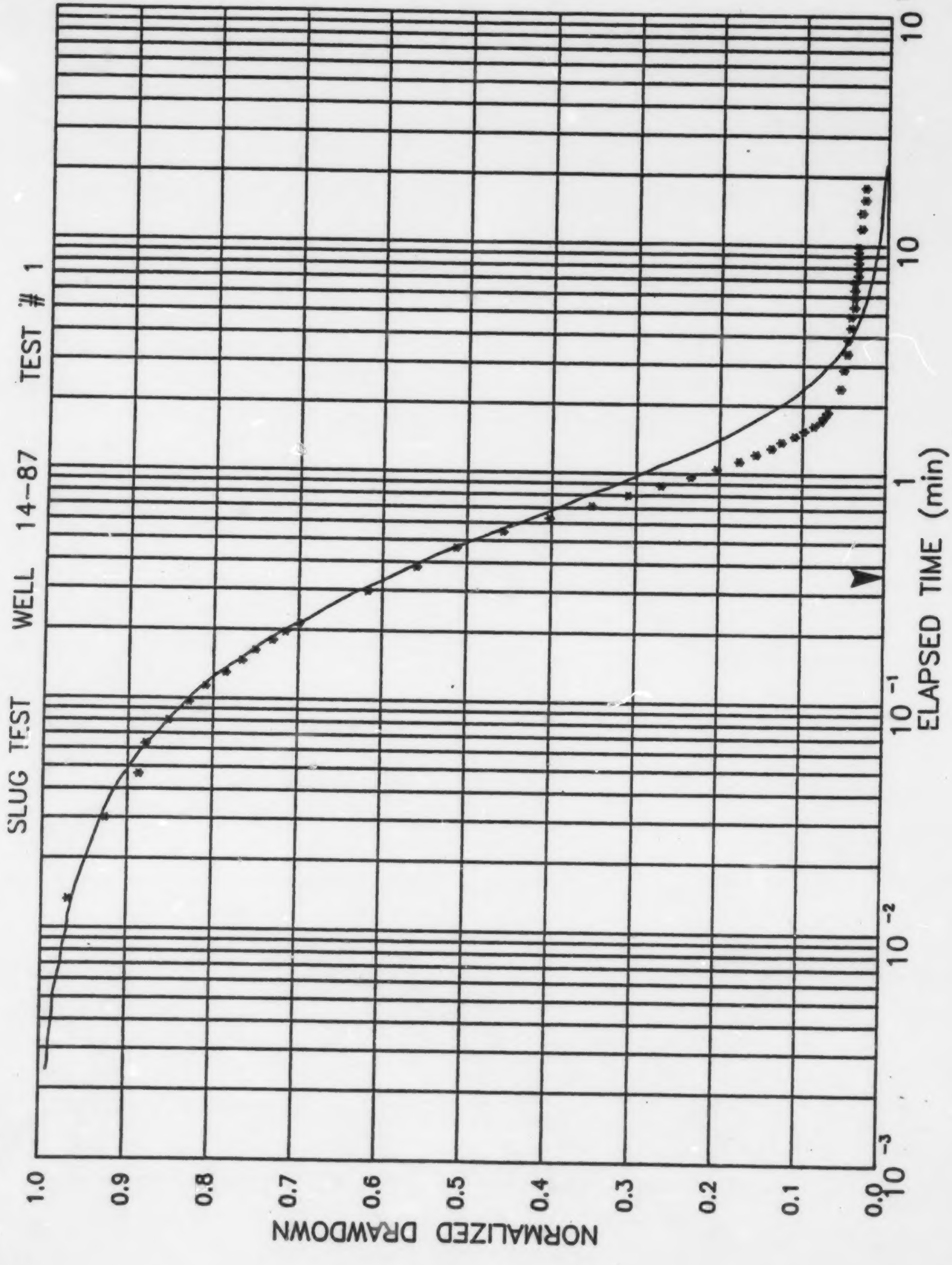

SLUG TEST WELL 11-87 TEST # 4
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (min)
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}

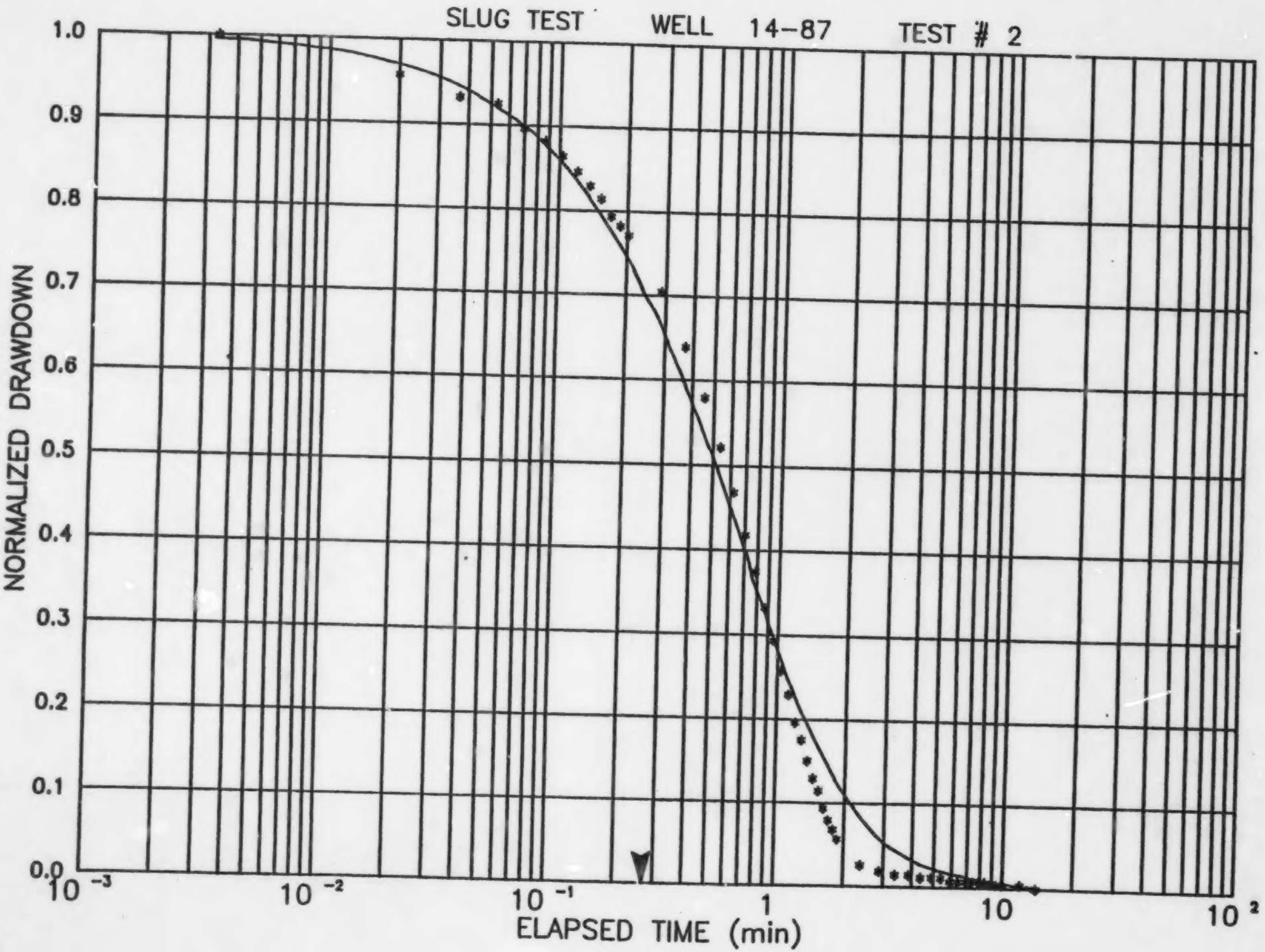

SLUG TEST WELL 13-87 TEST # 1
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
ELAPSED TIME (min)

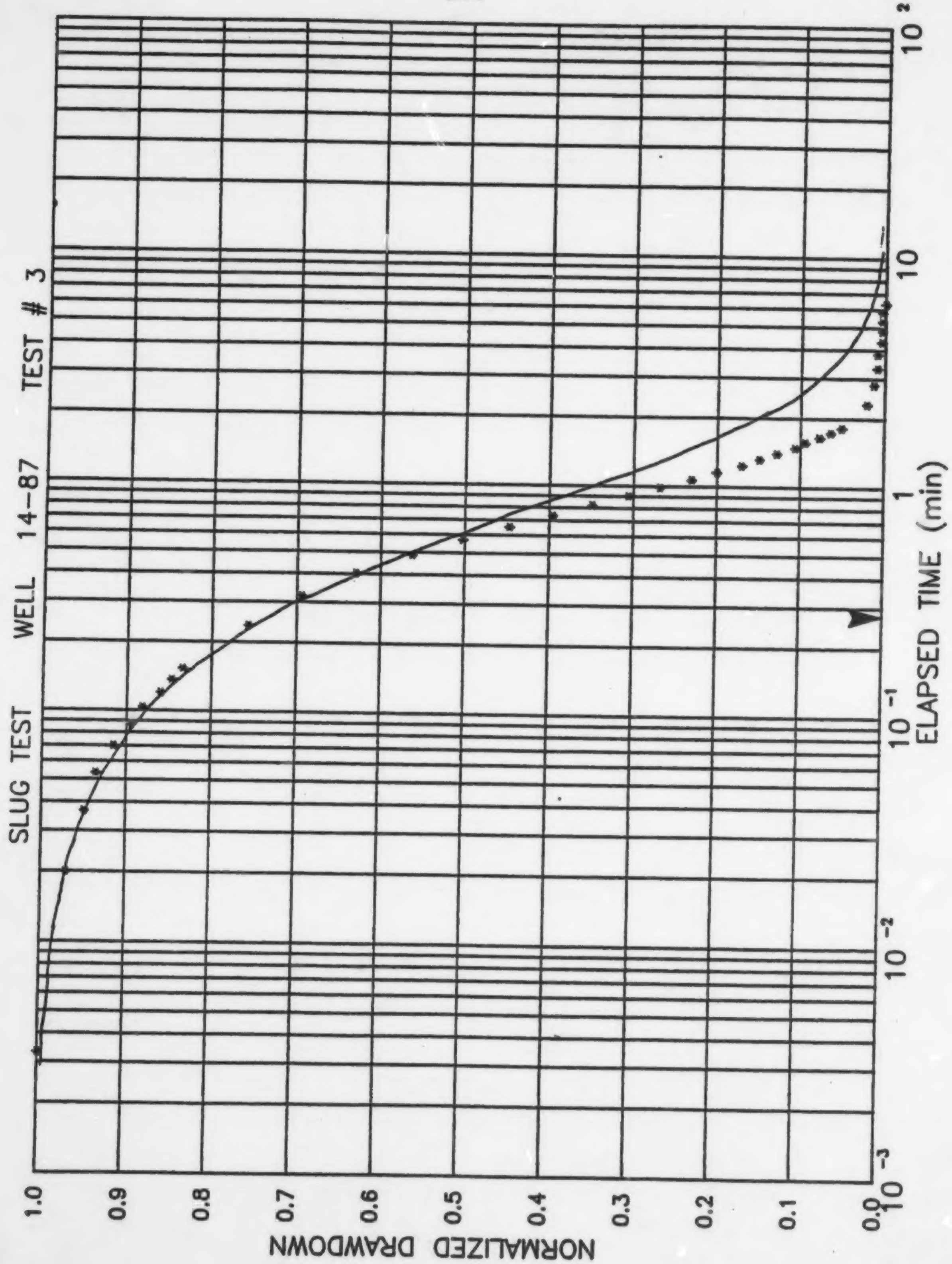

SLUG TEST WELL 13-87 TEST # 2
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (min)
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}

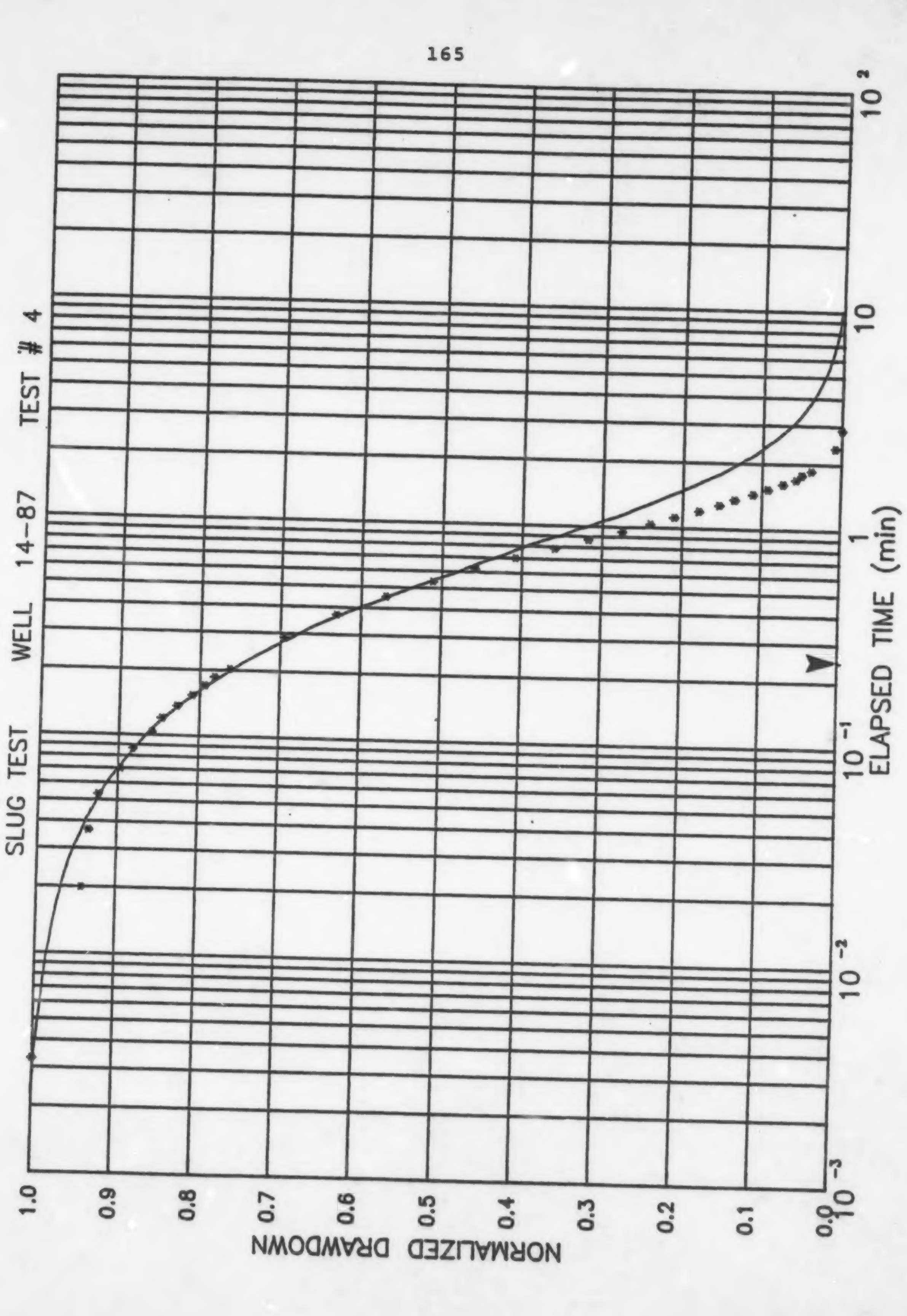

SLUG TEST WELL 13-87 TEST # 3
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 -3
10 -2
10 -1
1
10
10 2
ELAPSED TIME (min)

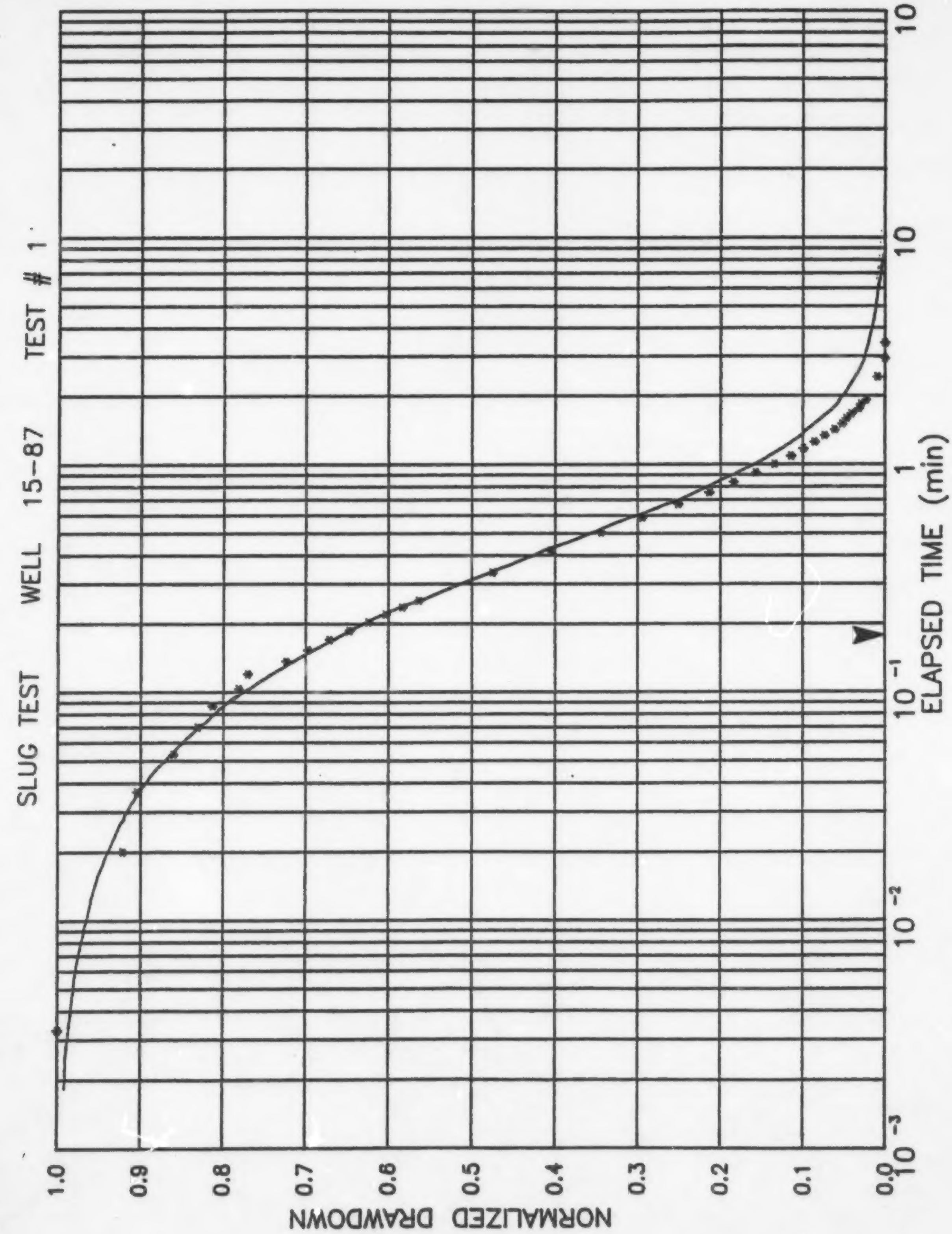

SLUG TEST WELL 13-87 TEST # 4
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (min)
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}

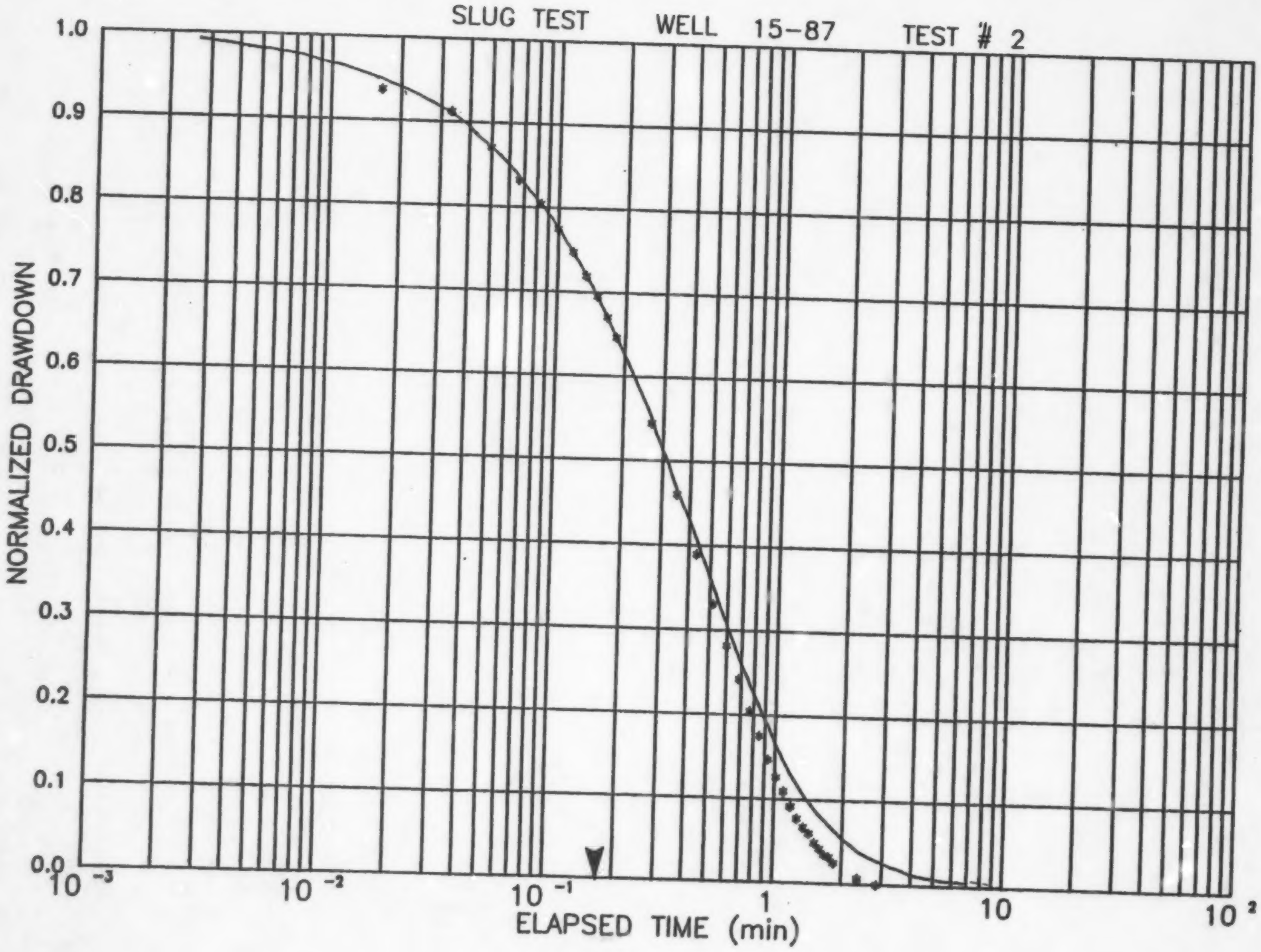

SLUG TEST WELL 14-87 TEST # 1
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (min)
10^0
10^-3
10^-2
10^-1
1
10
10^2


SLUG TEST WELL 14-87 TEST # 2
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
ELAPSED TIME (min)

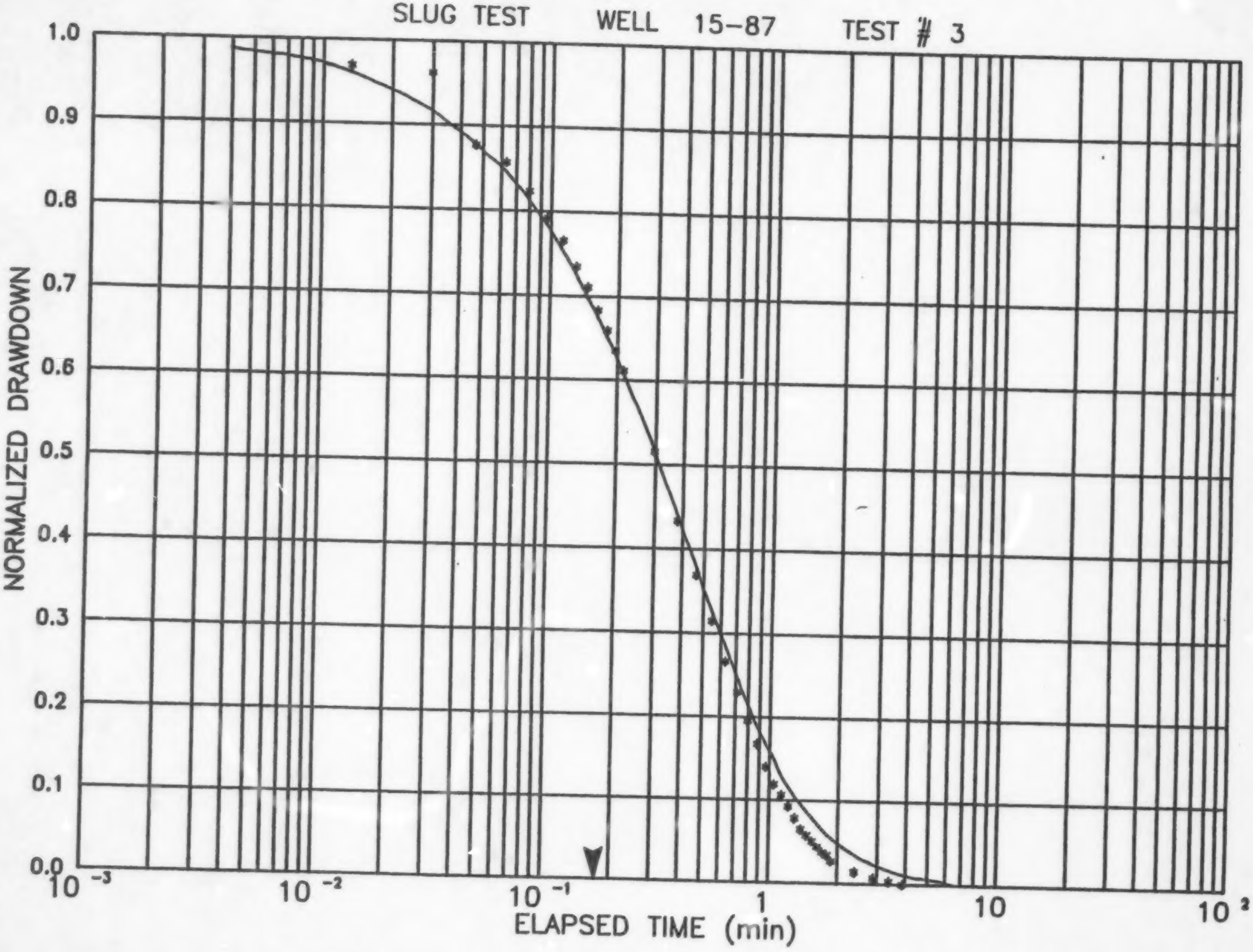

SLUG TEST WELL 14-87 TEST # 3
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (min)
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}

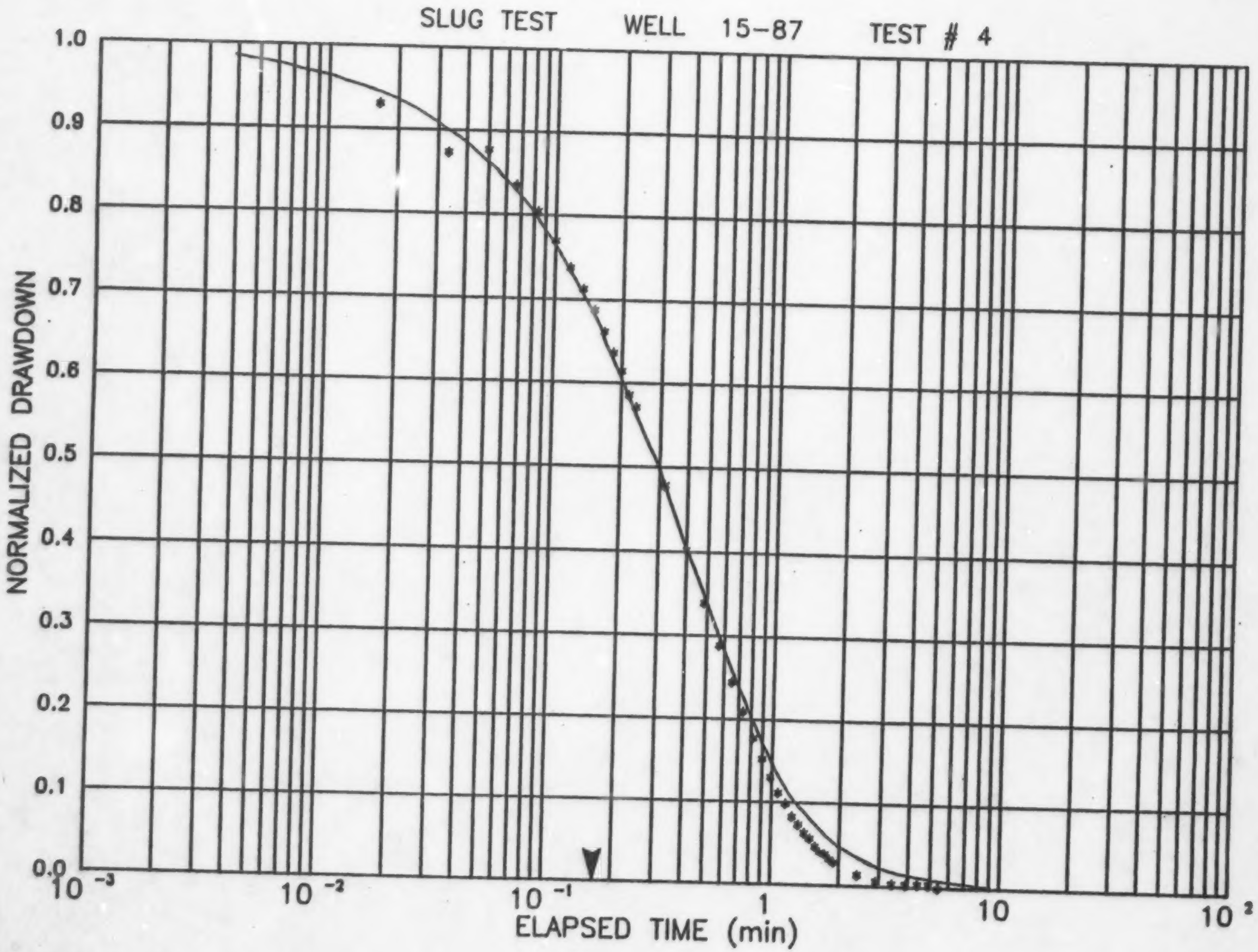

SLUG TEST WELL 14-87 TEST # 4
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 ⁻³
10 ⁻²
10 ⁻¹
1
10
10 ²
ELAPSED TIME (min)


SLUG TEST WELL 15-87 TEST # 1
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10 −3
10 −2
10 −1
1
10
10 2
ELAPSED TIME (min)



SLUG TEST WELL 15-87 TEST # 2


SLUG TEST WELL 15-87 TEST # 3
NORMALIZED DRAWDOWN
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-3}
10^{-2}
10^{-1}
1
10
10^{2}
ELAPSED TIME (min)



SLUG TEST WELL 15-87 TEST # 4

APPENDIX E2

Withdrawal Tests
Fresh Water Aquifer

Table E2-1 Summary of Withdrawal Tests

Fresh Water Aquifer

Well	Test Duration (min)	Flow rate Q (L/min)	Drawdown H (m)	Transmissivity* T (m^2/s)	Hydraulic** Conductivity K (m/s)
6-86	60	0.44	0.16	4×10^{-5}	2×10^{-5}
4-87	55	0.56	0.02	4×10^{-4}	2×10^{-4}
6-87	45	0.58	0.18	5×10^{-5}	2×10^{-5}
10-87	50	0.50	0.05	1×10^{-4}	7×10^{-5}
11-87	45	0.63	0.25	4×10^{-5}	2×10^{-5}
14-87	30	0.30	0.05	$8 \text{ X } 10^{-5}$	$4 \text{ X } 10^{-5}$

* Determined assuming steady radial confined flow:

$$T = \frac{Q}{\Delta H 2\pi} \ln(r_b/r_w) \quad \text{(Hvorslev, 1951)}$$

where r_b = radius to constant pressure boundary, assumed equal to 5 m

r_w = radius of well, equal to 0.025 m

** Determined assuming 2 m formation thickness

APPENDIX E3

Recovery Tests
Fresh Water Aquifer

Table E3-1 Summary of Recovery Tests - Fresh Water Aquifer

Well	Fluid Level - Date (mAMSL)	Flow Rate* Q (L/min)	Average Drawdown H (m)	Transmissivity** T (m2/S)	Hydraulic*** Conductivity (m/s)
3-85	166.79-14/9/87; 164.62-19/1/87	3×10^{-5}	17.3	3×10^{-11}	1×10^{-11}
5-86	179.06-16/10/87; 179.13-19/10/87	3×10^{-5}	0.2	2×10^{-9}	1×10^{-9}
7-87	177.79-1/10/87; 181.51-4/10/87	2×10^{-3}	8.9	2×10^{-9}	1×10^{-9}
12-87	166.98-18/10/87; 167.30-19/10/87	4×10^{-4}	11.0	6×10^{-10}	3×10^{-10}

* Flow rate determined from change in water levels and elapsed time between level measurements

** Determined assuming steady radial confined flow (Hvorslev, 1951)

$$T = \frac{Q}{\Delta H 2\pi} \ln (r_b/r_w)$$

where $r_b = 5$ m
$r_w = 0.025$ m

***Determined assuming formation thickness of 2 m

APPENDIX E4

Well 3-86
Pump Test - Fresh Water Aquifer

Summary Table, Drawdown Responses and Type Curve Analyses

Table E4-1 Summary of Well 3-86 Pump Test - Fresh Water Aquifer

Well	Radial Distance r(m)	Match Points W (u)	s (m)	1/u	t (min)	*Transmissivity T (m^2/s)	**Storativity S
1-85	217	1	0.10	1	3.4	7×10^{-3}	1×10^{-4}
1-86	58	1	0.08	1	0.33	9×10^{-3}	2×10^{-4}
3-86	0	10	2.50	1000	6.0	3×10^{-3}	—
4-86	700	1	0.15	1	31.0	5×10^{-3}	7×10^{-5}
7-86	605	1	0.03	1	15.0	2×10^{-2}	2×10^{-4}
AQ1	400	1	0.09	1	140.0	8×10^{-3}	1×10^{-3}
AQ2	470	1	0.28	1	78.0	3×10^{-3}	2×10^{-4}
AQ3	740	1	0.19	1	65.0	7×10^{-3}	1×10^{-4}
AQ11	460	1	0.21	1	42.0	3×10^{-3}	2×10^{-4}

* Determined from $T = \frac{Q\,W(u)}{4\pi s}$ (Theis, 1935)

where Q = 560 L/min

**Determined from $S = \frac{4Ttu}{r^2}$ (Theis, 1935)

MONITORING WELL : 1-85

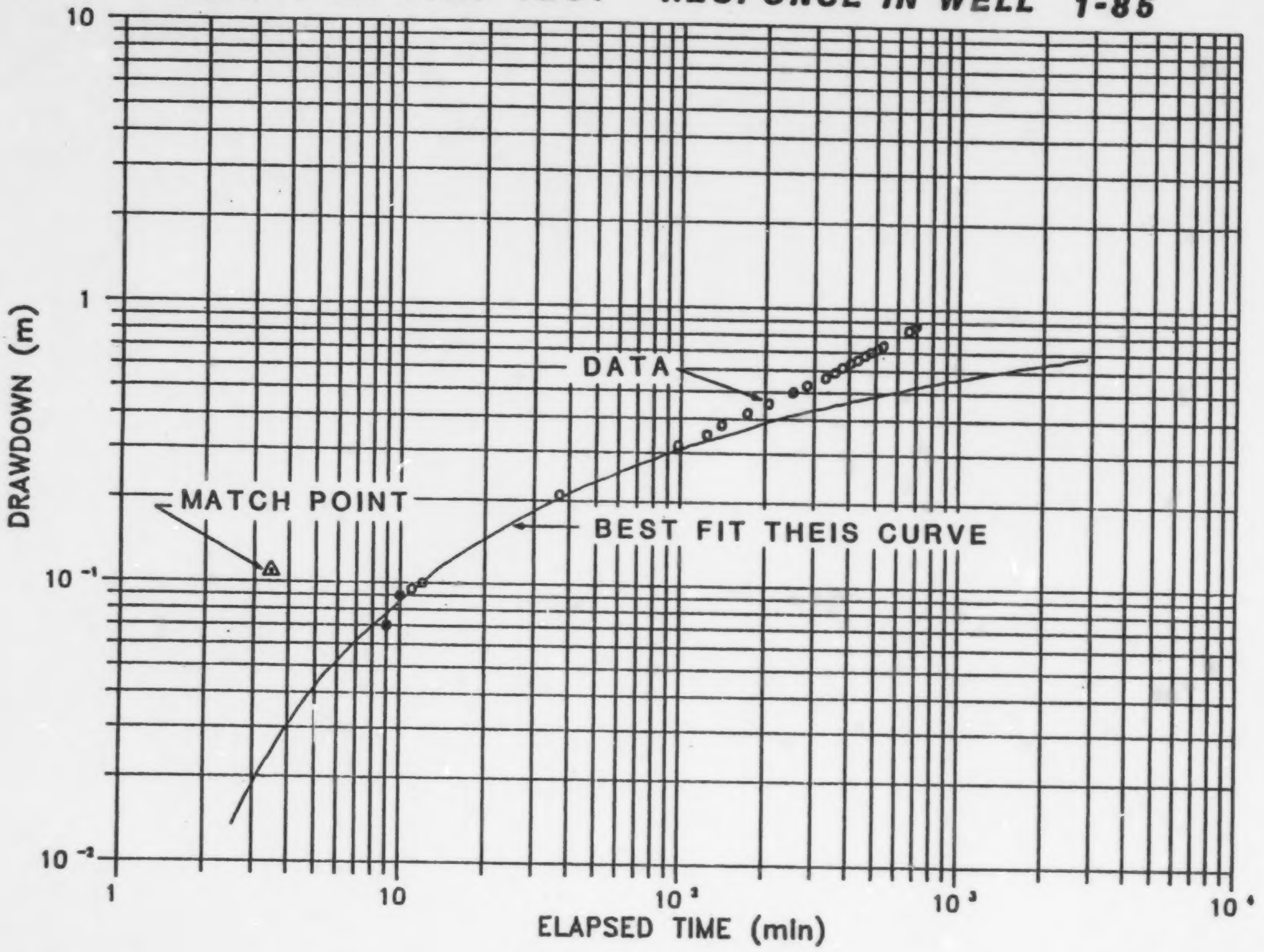
Drawdown

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:15:00	0.000	4.140	0.000
08:24:00	9.000	4.210	0.070
08:25:00	10.000	4.230	0.090
08:26:00	11.000	4.235	0.095
08:27:00	12.000	4.240	0.100
08:52:00	37.000	4.350	0.210
09:53:00	98.000	4.460	0.320
10:19:00	124.000	4.490	0.350
10:35:00	140.000	4.520	0.380
11:09:00	173.000	4.560	0.420
11:41:00	206.000	4.595	0.455
12:27:00	252.000	4.640	0.500
12:58:00	283.000	4.670	0.530
13:45:00	330.000	4.705	0.565
14:11:00	356.000	4.730	0.590
14:33:00	378.000	4.755	0.615
15:00:00	405.000	4.780	0.640
15:24:00	429.000	4.795	0.655
15:51:00	456.000	4.820	0.680
16:13:00	478.000	4.840	0.700
16:42:00	507.000	4.860	0.720
17:06:00	531.000	4.880	0.740
19:12:00	657.000	4.980	0.840
19:53:00	698.000	5.010	0.870

Recovery

20:19:00	724.000	5.005	0.865
20:20:00	725.000	4.995	0.855
20:21:00	726.000	4.980	0.840
20:22:00	727.000	4.975	0.835
20:23:00	728.000	4.965	0.825
20:25:00	730.000	4.955	0.815
20:27:00	732.000	4.945	0.805
20:29:00	734.000	4.935	0.795
20:32:00	737.000	4.920	0.780
20:40:00	745.000	4.895	0.755
21:00:00	765.000	4.860	0.720
21:35:00	800.000	4.825	0.685
21:55:00	820.000	4.800	0.660
22:05:00	830.000	4.790	0.650
09:05:00	1490.000	4.630	0.490
16:55:00	1960.000	4.565	0.425

WELL 3-86 PUMP TEST RESPONSE IN WELL 1-85



MONITORING WELL : Prince of Wales (Deep), 1-86

Drawdown

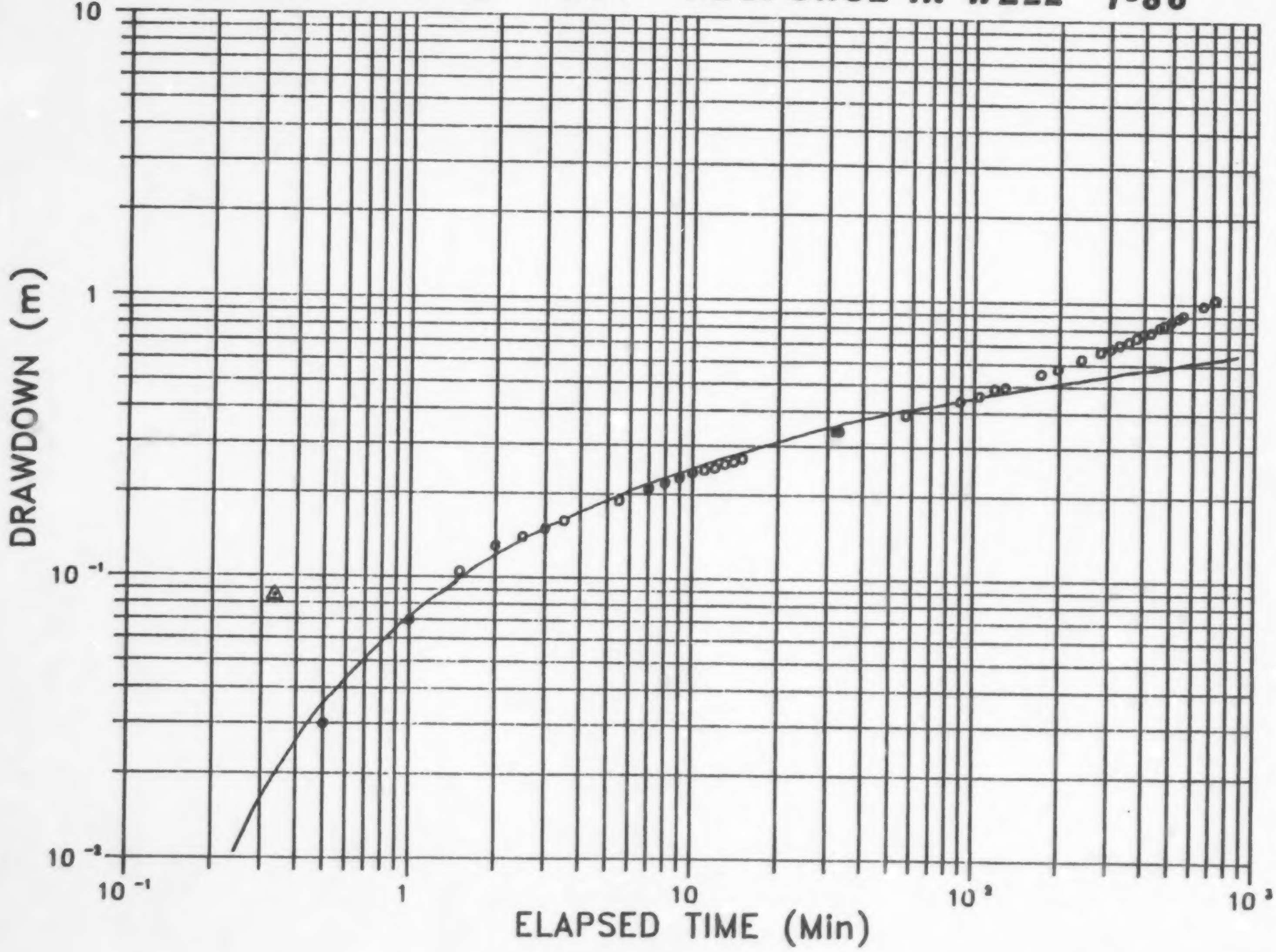
Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:15:00	0.000	6.060	0.000
08:15:30	0.500	6.090	0.030
08:16:00	1.000	6.130	0.070
08:16:30	1.500	6.165	0.105
08:17:00	2.000	6.190	0.130
08:17:30	2.500	6.200	0.140
08:18:00	3.000	6.210	0.150
08:18:30	3.500	6.220	0.160
08:20:30	5.500	6.250	0.190
08:22:00	7.000	6.270	0.210
08:23:00	8.000	6.280	0.220
08:24:00	9.000	6.290	0.230
08:25:00	10.000	6.300	0.240
08:26:00	11.000	6.305	0.245
08:27:00	12.000	6.310	0.250
08:28:00	13.000	6.318	0.258
08:29:00	14.000	6.323	0.263
08:30:00	15.000	6.330	0.270
08:47:00	32.000	6.400	0.340
08:48:00	33.000	6.400	0.340
09:12:00	57.000	6.450	0.390
09:44:00	89.000	6.500	0.440
09:59:00	104.000	6.520	0.460
10:13:00	118.000	6.550	0.490
10:24:00	129.000	6.555	0.495
11:07:00	172.000	6.615	0.555
11:33:00	198.000	6.640	0.580
12:14:00	239.000	6.690	0.630
12:55:00	280.000	6.730	0.670
13:20:00	305.000	6.750	0.690
13:42:00	327.000	6.770	0.710
14:08:00	353.000	6.790	0.730
14:30:00	375.000	6.815	0.755
14:54:00	399.000	6.840	0.780
15:18:00	423.000	6.850	0.790
15:48:00	453.000	6.885	0.825
16:06:00	471.000	6.900	0.840
16:34:00	499.000	6.925	0.865
17:04:00	529.000	6.950	0.890
17:24:00	549.000	6.970	0.910
19:04:00	649.000	7.050	0.990
20:03:00	708.000	7.095	1.035
20:14:30	719.000	7.100	1.040

MONITORING WELL : Prince of Wales (Deep), 1-86 (continued)

Recovery

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
20:16:00	721.000	7.050	0.990
20:16:30	721.500	7.030	0.970
20:17:00	722.000	7.000	0.940
20:17:30	722.500	6.985	0.925
20:18:00	723.000	6.970	0.910
20:18:30	723.500	6.960	0.900
20:19:00	724.000	6.952	0.892
20:19:30	724.500	6.948	0.888
20:20:00	725.000	6.940	0.880
20:21:00	726.000	6.929	0.869
20:23:00	728.000	6.910	0.850
20:24:00	729.000	6.900	0.840
20:25:00	730.000	6.895	0.835
20:26:00	731.000	6.890	0.830
20:27:00	732.000	6.883	0.823
20:28:00	733.000	6.880	0.820
20:29:00	734.000	6.875	0.815
20:30:00	735.000	6.870	0.810
20:35:00	740.000	6.850	0.790
20:45:00	750.000	6.830	0.770
20:50:00	755.000	6.817	0.757
21:00:00	765.000	6.800	0.740
21:05:00	770.000	6.795	0.735
21:20:00	785.000	6.775	0.715
21:30:00	795.000	6.760	0.700
21:40:00	805.000	6.755	0.695
21:50:00	815.000	6.750	0.690
22:00:00	825.000	6.740	0.680
22:15:00	840.000	6.735	0.675
09:00:00	1485.000	6.570	0.510
10:28:00	1573.000	6.450	0.390
17:15:00	1980.000	6.495	0.435

WELL 3-86 PUMP TEST RESPONSE IN WELL 1-86



PUMPING WELL: 3-86

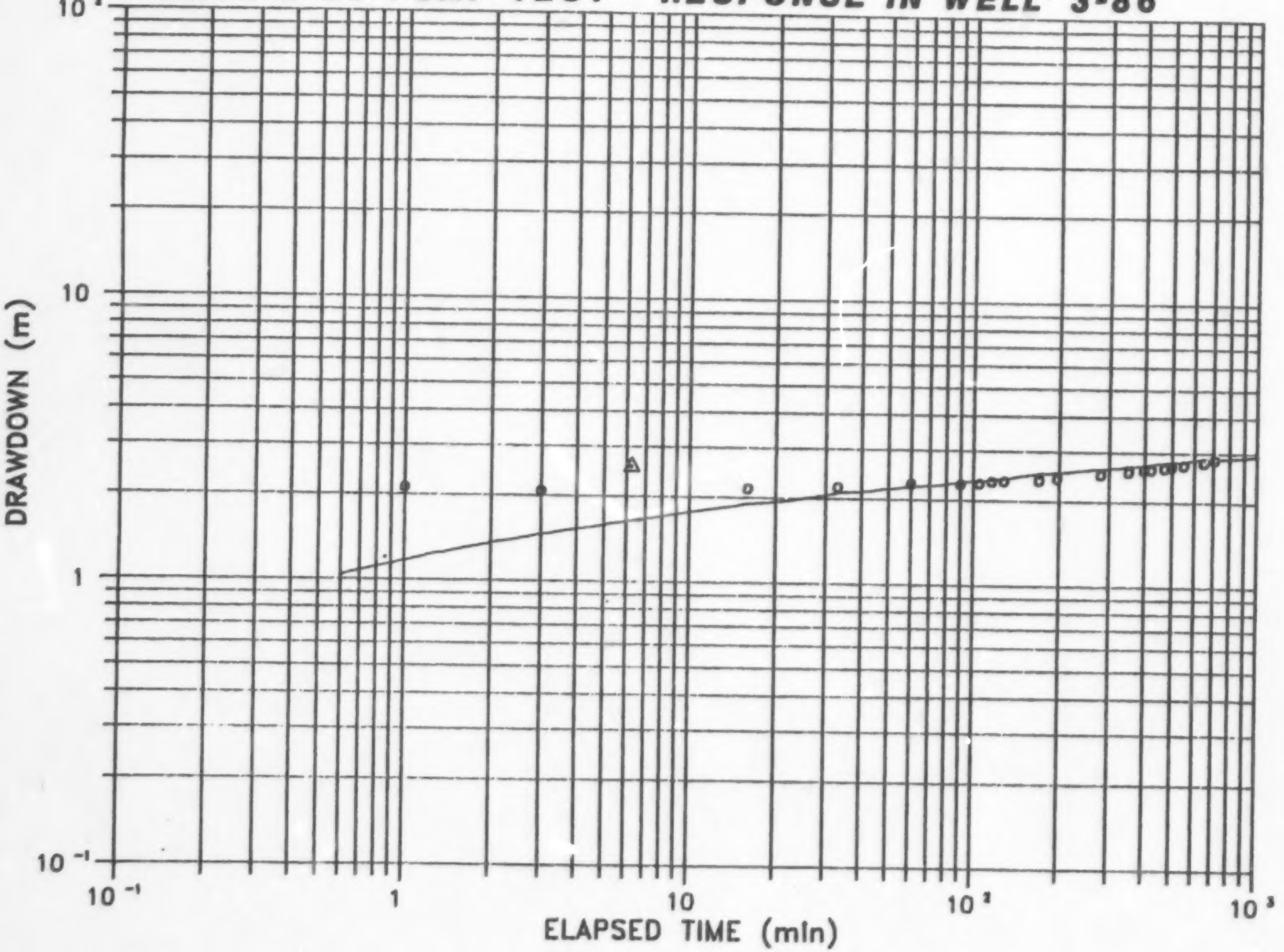
Drawdown

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:15:00	0.000	5.000	0.000
08:16:00	1.000	7.120	2.120
08:18:00	3.000	7.080	2.080
08:31:00	16.000	7.150	2.150
08:48:00	33.000	7.200	2.200
09:15:00	60.000	7.280	2.280
09:45:00	90.000	7.280	2.280
10:00:00	105.000	7.300	2.300
10:11:00	116.000	7.340	2.340
10:23:00	128.000	7.350	2.350
11:05:00	170.000	7.370	2.370
11:32:00	197.000	7.410	2.410
12:55:00	280.000	7.500	2.500
14:06:00	351.000	7.560	2.560
14:53:00	398.000	7.600	2.600
15:17:00	422.000	7.610	2.610
16:05:00	470.000	7.650	2.650
16:33:00	498.000	7.670	2.670
17:25:00	550.000	7.710	2.710
19:03:00	648.000	7.770	2.770
20:02:00	707.000	7.840	2.840

Recovery

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
20:22:00	727.000	5.870	0.870
20:26:00	731.000	5.860	0.860
20:32:00	737.000	5.840	0.840
20:48:00	753.000	5.760	0.760
21:07:00	772.000	5.740	0.740
21:08:00	773.000	5.740	0.740
21:37:00	802.000	5.730	0.730
21:59:00	824.000	5.680	0.680
22:16:00	841.000	5.660	0.660
08:59:00	1484.000	5.500	0.500
10:26:00	1571.000	5.480	0.480

WELL 3-86 PUMP TEST RESPONSE IN WELL 3-86



MONITORING WELL : Victoria Park, 4-86

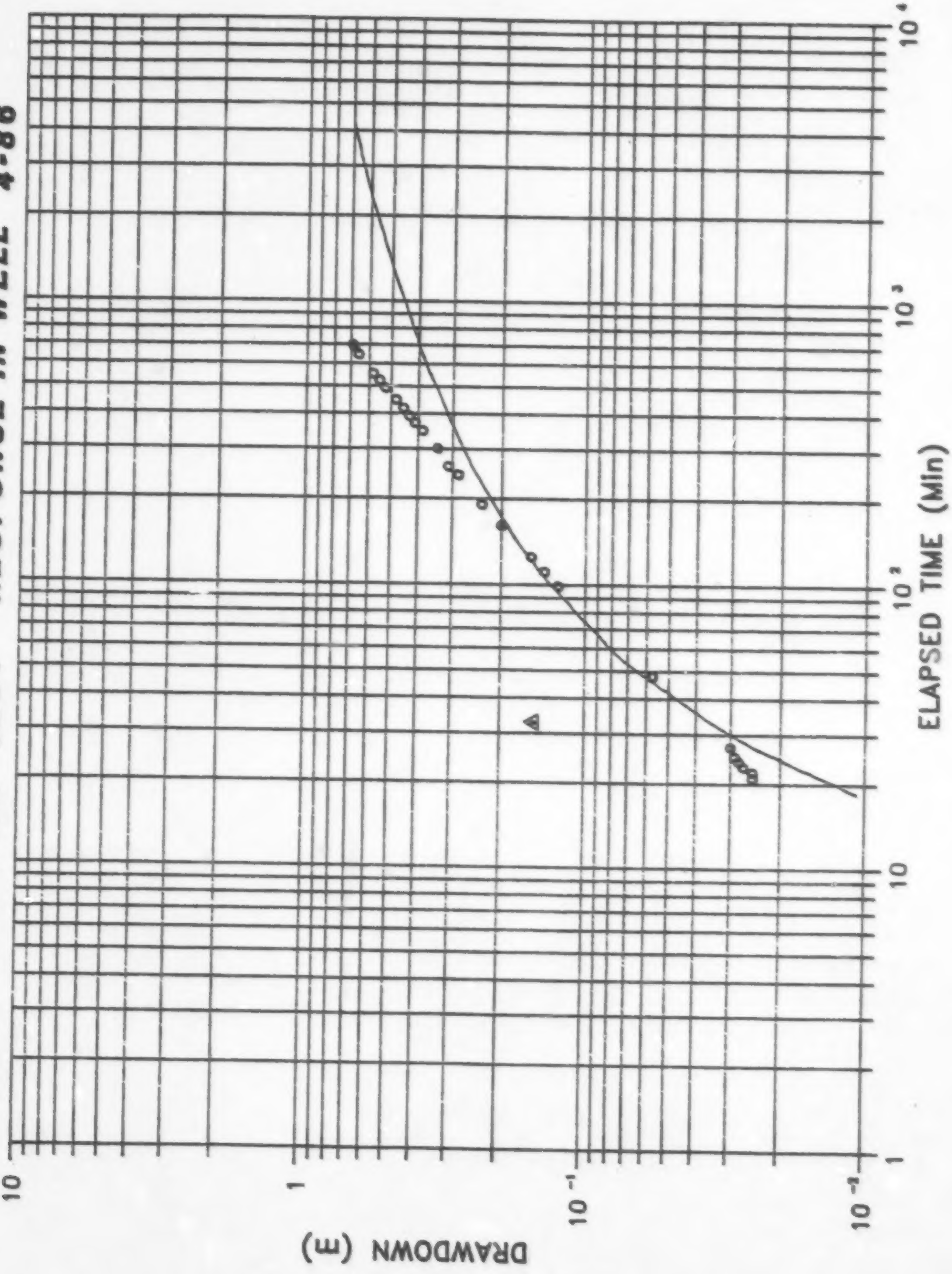
Drawdown

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:15:00	0.000	5.070	0.000
08:36:00	21.000	5.095	0.025
08:37:00	22.000	5.095	0.025
08:38:00	23.000	5.097	0.027
08:39:00	24.000	5.098	0.028
08:40:00	25.000	5.099	0.029
08:42:00	27.000	5.100	0.030
09:03:00	48.000	5.127	0.057
09:54:00	99.000	5.195	0.125
10:06:00	111.000	5.210	0.140
10:20:00	125.000	5.226	0.156
10:56:00	161.000	5.270	0.200
11:26:00	191.000	5.305	0.235
12:18:00	243.000	5.355	0.285
12:35:00	260.000	5.380	0.310
13:16:00	301.000	5.410	0.340
14:03:00	348.000	5.455	0.385
14:26:00	371.000	5.480	0.410
14:47:00	392.000	5.500	0.430
15:13:00	418.000	5.522	0.452
15:42:00	447.000	5.550	0.480
16:28:00	493.000	5.595	0.525
16:59:00	524.000	5.620	0.550
17:29:00	554.000	5.650	0.580
18:59:00	644.000	5.725	0.655
19:36:00	681.000	5.750	0.680
19:54:00	699.000	5.760	0.690

Recovery

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
20:41:00	746.000	5.785	0.715
21:14:00	779.000	5.770	0.700
21:27:00	792.000	5.765	0.695
21:45:00	810.000	5.760	0.690
22:05:00	830.000	5.750	0.680
08:55:00	1480.000	5.590	0.520
16:50:00	1835.000	5.510	0.440

WELL 3-86 PUMP TEST RESPONSE IN WELL 4-86



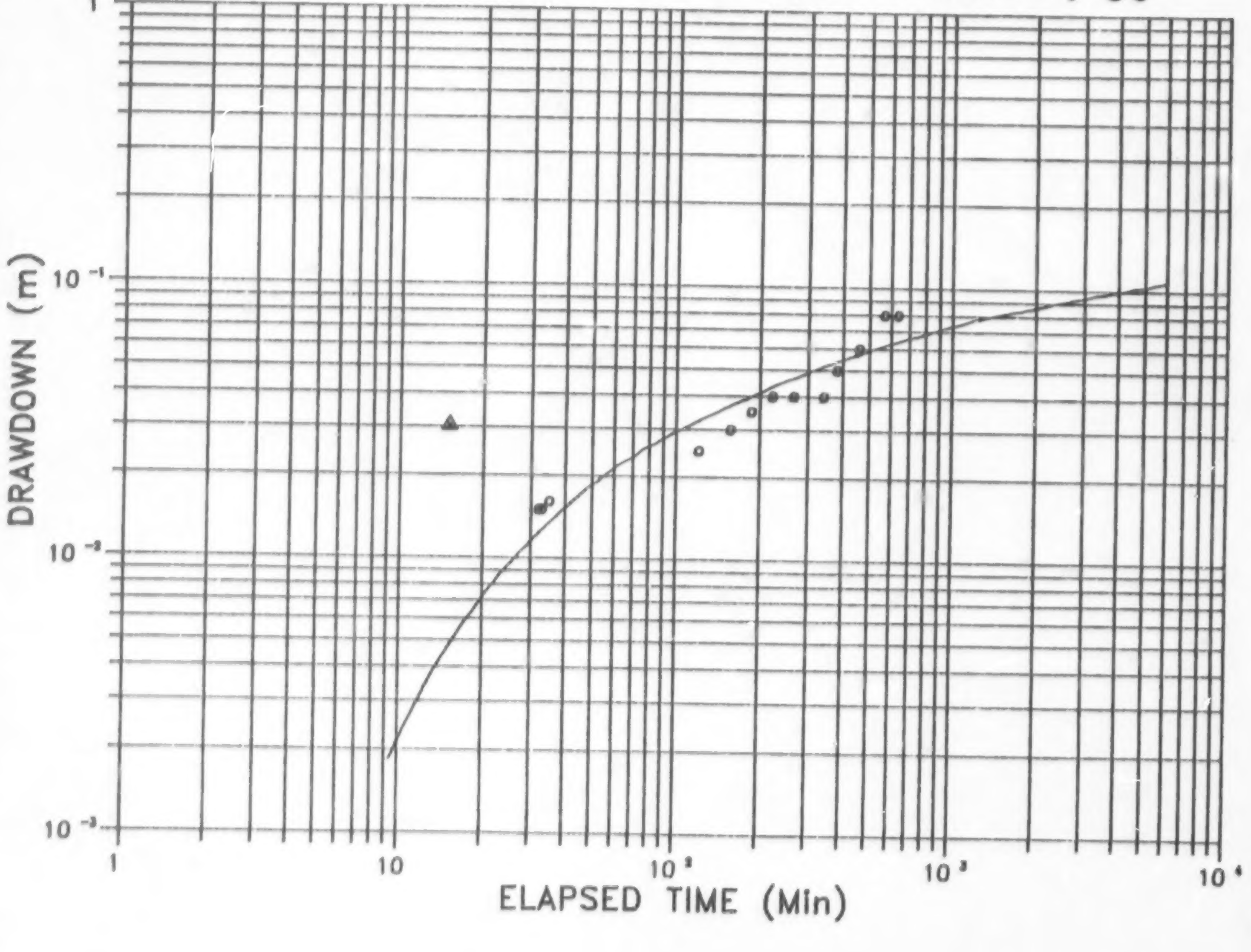
MONITORING WELL : CN, 7-86

Drawdown

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:15:00	0.000	5.260	0.000
08:47:00	32.000	5.275	0.015
08:48:00	33.000	5.275	0.015
08:50:00	35.000	5.276	0.016
10:16:00	121.000	5.285	0.025
10:52:00	157.000	5.290	0.030
11:22:00	187.000	5.295	0.035
11:58:00	223.000	5.300	0.040
12:41:00	266.000	5.300	0.040
13:58:00	343.000	5.300	0.040
15:37:00	382.000	5.310	0.050
16:55:00	460.000	5.320	0.060
18:43:00	568.000	5.340	0.080
19:50:00	635.000	5.340	0.080

Recovery

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:50:00	1475.000	5.370	0.110
16:46:00	1831.000	5.360	0.100



WELL 3-86 PUMP TEST RESPONSE IN WELL 7-86

MONITORING WELL : AQ-1b

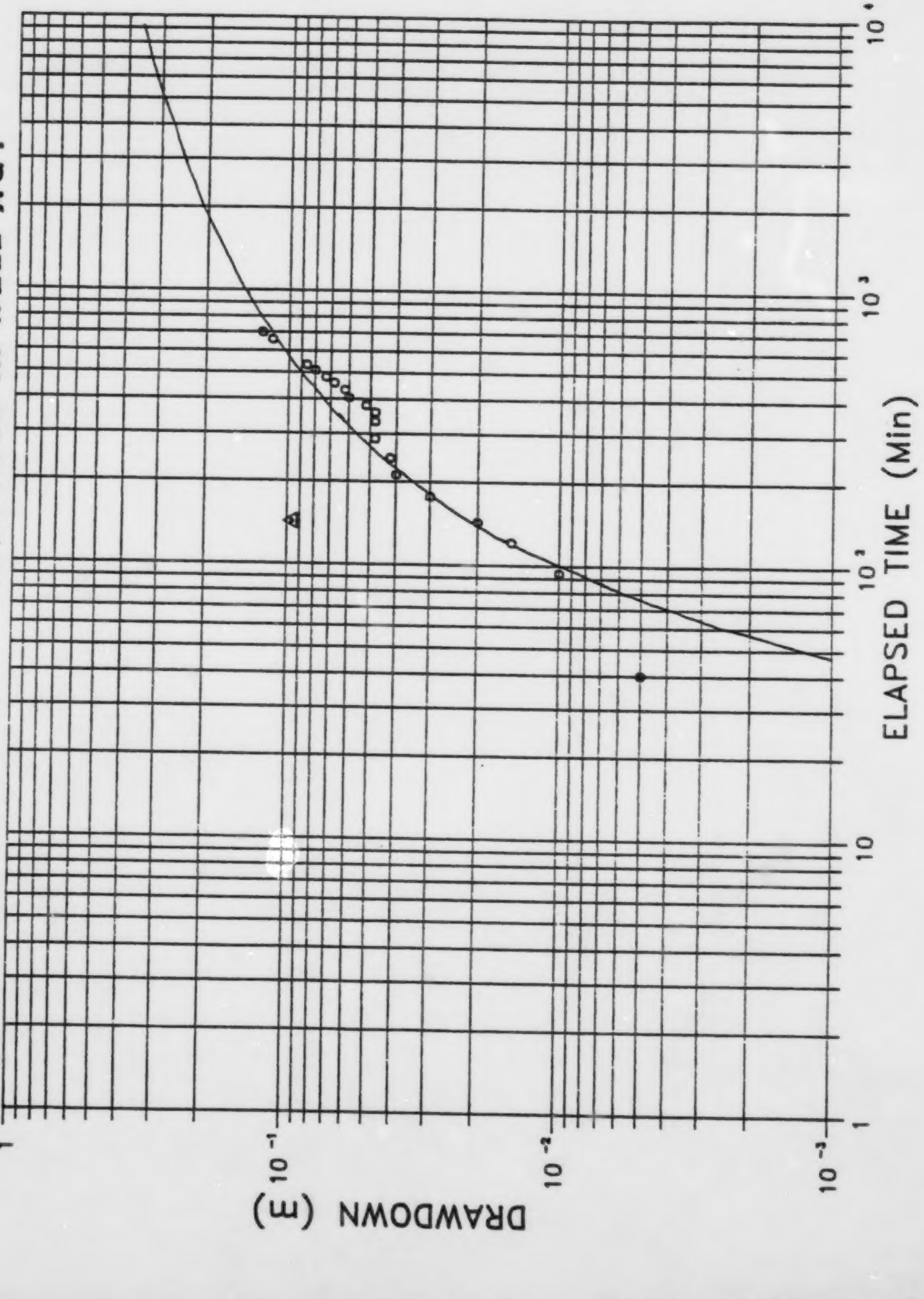
Drawdown

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:15:00	0.000	2.990	0.000
08:30:00	15.000	2.995	0.005
08:55:00	40.000	2.995	0.005
09:49:00	94.000	3.000	0.010
10:16:00	121.000	3.005	0.015
10:38:00	143.000	3.010	0.020
11:12:00	177.000	3.020	0.030
11:47:00	212.000	3.030	0.040
12:29:00	244.000	3.032	0.042
13:02:00	287.000	3.038	0.048
13:47:00	332.000	3.038	0.048
14:13:00	358.000	3.038	0.048
14:35:00	380.000	3.042	0.052
15:00:00	405.000	3.050	0.060
15:27:00	432.000	3.052	0.062
15:53:00	458.000	3.058	0.068
16:15:00	480.000	3.063	0.073
16:44:00	509.000	3.070	0.080
17:08:00	533.000	3.076	0.086
19:14:00	659.000	3.105	0.115
19:55:00	700.000	3.115	0.125

Recovery

09:07:00	1492.000	3.235	0.245
16:58:00	1843.000	3.240	0.250

WELL 3-86 PUMP TEST RESPONSE IN WELL AQ1



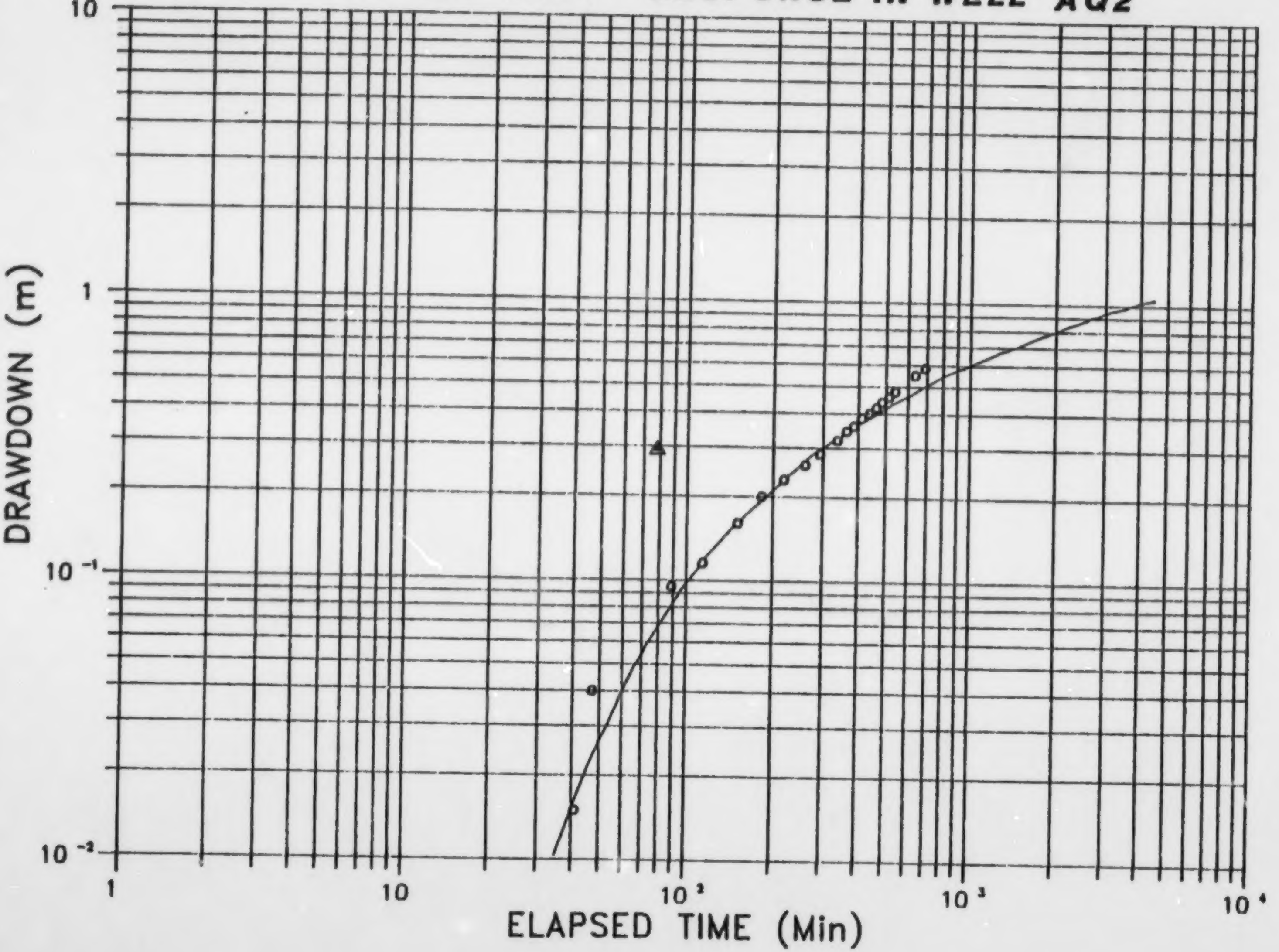
MONITORING WELL : AQ-2

Drawdown

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:15:00	0.000	5.360	0.000
08:36:00	41.000	5.375	0.015
09:02:00	47.000	5.400	0.040
09:44:00	89.000	5.455	0.095
10:09:00	114.000	5.475	0.115
10:46:00	151.000	5.520	0.160
11:18:00	183.000	5.560	0.200
11:54:00	219.000	5.590	0.230
12:35:00	260.000	5.620	0.260
13:09:00	294.000	5.645	0.285
13:53:00	338.000	5.680	0.320
14:19:00	364.000	5.705	0.345
14:41:00	386.000	5.720	0.360
15:07:00	412.000	5.745	0.385
15:33:00	438.000	5.760	0.400
15:59:00	464.000	5.780	0.420
16:20:00	485.000	5.800	0.440
16:50:00	515.000	5.820	0.460
17:15:00	540.000	5.840	0.480
18:51:00	636.000	5.910	0.550
19:47:00	692.000	5.945	0.585

Recovery

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
20:53:00	758.000	5.960	0.600
09:16:00	1501.000	5.820	0.460
17:05:00	1970.000	5.770	0.410



WELL 3-86 PUMP TEST RESPONSE IN WELL AQ2

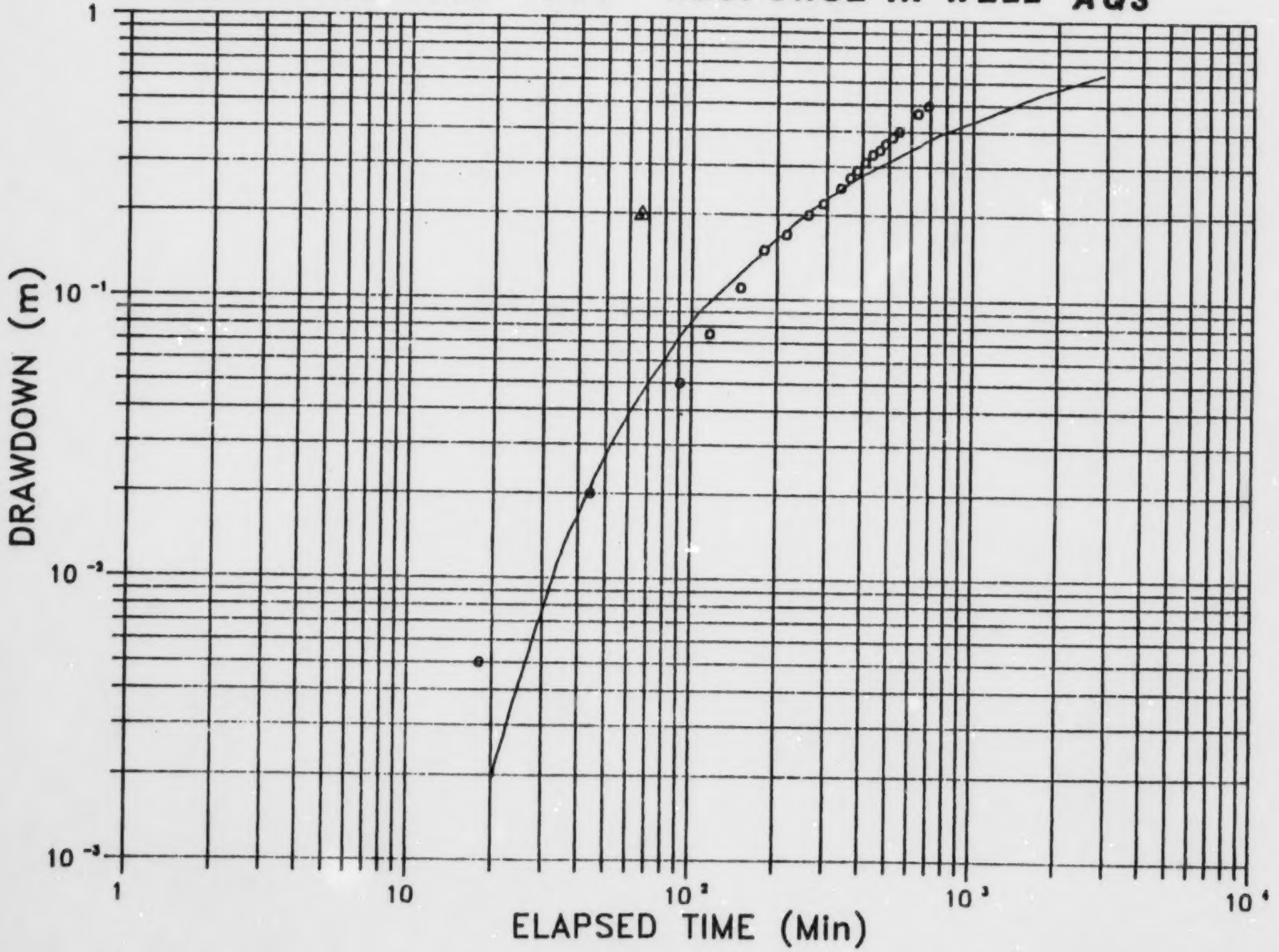
MONITORING WELL : AQ-3

Drawdown

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:15:00	0.000	5.640	0.000
08:33:00	18.000	5.645	0.005
08:59:00	44.000	5.660	0.020
09:46:00	91.000	5.690	0.050
10:11:00	116.000	5.715	0.075
10:44:00	149.000	5.750	0.110
11:15:00	180.000	5.790	0.150
11:51:00	216.000	5.810	0.170
12:33:00	258.000	5.840	0.200
13:06:00	291.000	5.860	0.220
13:51:00	336.000	5.890	0.250
14:17:00	362.000	5.913	0.273
14:39:00	384.000	5.930	0.290
15:05:00	410.000	5.950	0.310
15:31:00	436.000	5.970	0.330
15:57:00	462.000	5.982	0.342
16:19:00	484.000	6.000	0.360
16:48:00	513.000	6.020	0.380
17:17:00	542.000	6.040	0.400
18:48:00	633.000	6.105	0.465
19:42:00	688.000	6.135	0.495

Recovery

20:48:00	753.000	6.160	0.520
09:12:00	1497.000	6.075	0.435
17:07:00	1972.000	6.030	0.390



WELL 3-86 PUMP TEST RESPONSE IN WELL AQ3

MONITORING WELL : AQ-11

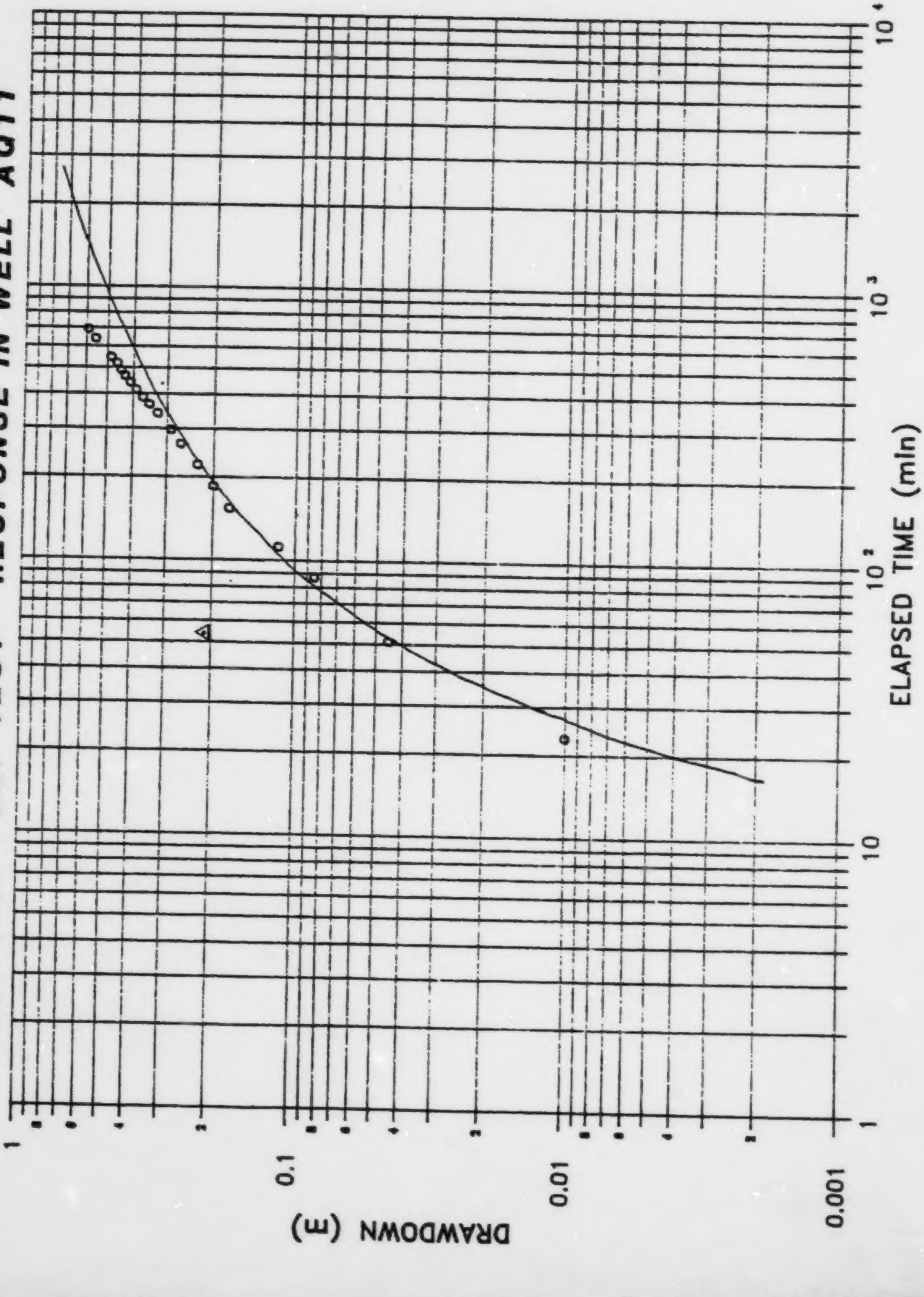
Drawdown

Time of Reading (hr:min:sec)	Elapsed Time (min)	Water Level (m BTC)	Drawdown (metres)
08:15:00	0.000	6.020	0.000
08:38:00	23.000	6.030	0.010
09:04:00	51.000	6.065	0.045
09:42:00	87.000	6.105	0.085
10:07:00	112.000	6.135	0.115
10:49:00	154.000	6.195	0.175
11:20:00	185.000	6.220	0.200
11:56:00	221.000	6.250	0.230
12:38:00	263.000	6.286	0.266
13:11:00	296.000	6.310	0.290
13:55:00	340.000	6.345	0.325
14:21:00	366.000	6.368	0.348
14:43:00	388.000	6.388	0.368
15:09:00	414.000	6.410	0.390
15:35:00	440.000	6.430	0.410
16:01:00	466.000	6.450	0.430
16:23:00	488.000	6.465	0.445
16:53:00	518.000	6.480	0.460
17:20:00	545.000	6.505	0.485
18:53:00	638.000	6.575	0.555
19:45:00	690.000	6.610	0.590

Recovery

20:53:00	758.000	6.620	0.600
09:19:00	1504.000	6.480	0.460
16:10:00	1915.000	6.420	0.400

WELL 3-86 PUMP TEST RESPONSE IN WELL AQ11



APPENDIX F

Water Levels
Fresh Water Aquifer

TABLE F-1 SARNIA - MOE GROUNDWATER MONITORING PROGRAM
WATER LEVEL RECORD SHEET 1987

		DATE MEASURED >		Oct.1/87		Oct.4/87		Oct.7/87	
Well ID	Location Description	Well Elevation (m. AMSL)	Ground Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)
1-85	ESSO	181.26							
2-85	Mitton St.	184.80				1.98	182.82		
3-85	Sewage plant	185.11		4.29	180.82	4.27	180.84		
4-85	Staffhouse	183.76		5.18	178.58				
5-85	Hwy.40 @ Churchill	187.62		4.33	183.29	4.41	183.21		
6-85	LaSalle Rd.	180.00		2.57	177.43			2.60	177.40
7-85	CIL Plant	178.91							
1-86	POW Park (Deep)	183.20		6.02	177.18	6.14	177.06	6.10	177.10
2-86	POW Park (Shallow)	183.21		3.35	179.86	3.39	179.82	3.37	179.84
3-86	POW Park (Pumping)	181.93		4.75	177.18	4.88	177.05	4.82	177.11
4-86	Victoria Park	182.15				5.14	177.01	5.10	177.05
5-86	Huron @ Tashmoo	183.36		4.15	179.21	4.19	179.17		
6-86	Sludge Lagoons	192.00				6.55	185.45		
7-86	CN Tunnel	184.32		5.28	179.04	5.33	178.99	5.27	179.05
8-86	Hydro Tower/St.C.R.P.	184.64		6.90	177.74	6.99	177.65		
1-87	Germain Park	183.29	182.58	1.92	181.36	2.07	181.22		
2-87	Centennial Park	178.24	177.53	1.57	176.60	1.70	176.54	1.62	176.62
3-87	Talfourd St.	183.41	182.55	2.77	180.58	2.86	180.55	19.15	164.26
4-87	Campbell @ Alice	185.70	185.00	3.02	182.61	3.17	182.53	3.11	182.59
5-87	Hwy 40 @ LaSalle	187.96	187.38	3.82	184.04	3.87	184.09		
6-87	Guthrie Park	181.86	181.11	4.71	177.08	4.81	177.05	4.75	177.11
7-87	CR 4 @ SD 19	197.35	196.72	19.49	177.79	15.84	181.51	30.50	166.85
8-87	LaSalle E. of Scott	190.26	189.51	3.95	186.33	4.04	186.22	4.02	186.24
9-87	Churchill E. of Plank	191.58	190.66	4.51	187.01	4.62	186.96	4.52	187.06
10-87	Air Products	192.77	191.88	5.79	186.98	5.78	186.99	5.73	187.04
11-87	Polymer Rd./S.I.R.	182.19	181.49	5.05	177.09	5.10	177.09	5.03	177.16
12-87	Polysar	184.04	183.12	15.96	168.01	24.12	159.92		
13-87	Suncor	184.66	183.77	6.60	178.06	6.64	178.02	6.54	178.12
14-87	Hwy 40 @ Dow Brine	192.32	191.61	7.82	184.42	7.77	184.55	7.68	184.64
15-87	Dow/Churchill @ Vidal	183.69	182.79	6.44	177.23	6.55	177.14	6.50	177.19
ESSO									
AQ-1		179.29							
AQ-2		182.09							
AQ-3		182.49							
AQ-4		179.27							
AQ-6		184.28							
AQ-7		190.67							
AQ-8		188.05							
AQ-10		183.34							
AQ-11		182.73							
ST. CLAIR RIVER									
1	Point Edward, Ont.				176.37		176.39		176.38
2	Port Huron, Mich.				176.33		176.35		176.35
3	Marysville, Mich.				176.10		176.11		176.10

NOTE: 1) Water levels for 1985 MOE wells & 1986 Environment Canada wells are measured with respect to top of casing.
2) Water levels for the 1987 MOE wells are measured with respect to the top of the Geoguard pump.
3) ESSO water levels provided courtesy of Esso Petroleum Canada.

TABLE F-1 (cont'd)

SARNIA - MOE GROUNDWATER MONITORING PROGRAM
WATER LEVEL RECORD SHEET 1987

		DATE MEASURED >		Oct.14/87		Oct.15/87		Oct.16/87	
Well ID	Location Description	Well Elevation (m. AMSL)	Ground Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)
1-85	ESSO	181.26							
2-85	Mitton St.	184.80		1.99	182.81			2.00	182.80
3-85	Sewage plant	185.11		18.32	166.79				
4-85	Staffhouse	183.76							
5-85	Hwy.40 @ Churchill	187.62							
6-85	LaSalle Rd.	180.00							
7-85	CIL Plant	178.91							
1-86	POW Park (Deep)	183.20				6.19	177.01	6.18	177.02
2-86	POW Park (Shallow)	183.21				3.39	179.82	7.41	175.80
3-86	POW Park (Pumping)	181.93				4.92	177.01	4.89	177.04
4-86	Victoria Park	182.15		5.18	176.97				
5-86	Huron @ Tashmoo	183.36						4.30	179.06
6-86	Sludge Lagoons	192.00							
7-86	CN Tunnel	184.32		5.40	178.92	5.39	178.93	5.37	178.95
8-86	Hydro Tower/St.C.R.P.	184.64							
1-87	Germain Park	183.29	182.58	2.10	181.19			2.08	181.21
2-87	Centennial Park	178.24	177.53	1.72	176.52			1.70	176.54
3-87	Talfourd St.	183.41	182.55	2.82	180.59			2.83	180.58
4-87	Campbell @ Alice	185.70	185.00	3.20	182.50			3.18	182.52
5-87	Hwy 40 @ LaSalle	187.96	187.38						
6-87	Guthrie Park	181.86	181.11						
7-87	CR 4 @ SD 19	197.35	196.72						
8-87	LaSalle E. of Scott	190.26	189.51						
9-87	Churchill E. of Plank	191.58	190.66						
10-87	Air Products	192.77	191.88						
11-87	Polymer Rd./S.I.R.	182.19	181.49						
12-87	Polysar	184.04	183.12						
13-87	Suncor	184.66	183.77						
14-87	Hwy 40 @ Dow Brine	192.32	191.61						
15-87	Dow/Churchill @ Vidal	183.69	182.79						
ESSO									
AQ-1		179.29							
AQ-2		182.09							
AQ-3		182.49							
AQ-4		179.27							
AQ-6		184.28							
AQ-7		190.67							
AQ-8		188.05							
AQ-10		183.34							
AQ-11		182.73							
ST. CLAIR RIVER									
1	Point Edward, Ont.				176.27		176.30		176.24
2	Port Huron, Mich.				176.22		176.25		176.22
3	Marysville, Mich.				176.00		176.02		175.97

NOTE: 1) Water levels for 1985 MOE wells & 1986 Environment Canada wells are measured with respect to top of casing.
2) Water levels for the 1987 MOE wells are measured with respect to the top of the Geoguard pump.
3) ESSO water levels provided courtesy of Esso Petroleum Canada.

TABLE F-1 (cont'd)

SARNIA - MOE GROUNDWATER MONITORING PROGRAM
WATER LEVEL RECORD SHEET 1987

		DATE MEASURED >		Oct.18/87		Oct.19/87		Oct.20/87	
Well ID	Location Description	Well Elevation (m. AMSL)	Ground Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)
1-85	ESSO	181.26							
2-85	Mitton St.	184.80				1.98	182.82		
3-85	Sewage plant	185.11							
4-85	Staffhouse	183.76							
5-85	Hwy.40 @ Churchill	187.62		4.42	183.20	4.43	183.19		
6-85	LaSalle Rd.	180.00		2.68	177.32				
7-85	CIL Plant	178.91							
1-86	POW Park (Deep)	183.20				6.16	177.04	6.11	177.09
2-86	POW Park (Shallow)	183.21				6.71	176.50	6.50	176.71
3-86	POW Park (Pumping)	181.93				4.89	177.04	4.83	177.10
4-86	Victoria Park	182.15				5.14	177.01	5.09	177.06
5-86	Huron @ Tashmoo	183.36		4.26	179.10	4.23	179.13		
6-86	Sludge Lagoons	192.00		6.55	185.45				
7-86	CN Tunnel	184.32				5.35	178.97	5.30	179.02
8-86	Hydro Tower/St.C.R.P.	184.64		6.94	177.70				
1-87	Germain Park	183.29	182.58			2.08	181.21	2.02	181.27
2-87	Centennial Park	178.24	177.53			1.68	176.56	1.63	176.61
3-87	Talfourd St.	183.41	182.55			2.83	180.58	2.84	180.57
4-87	Campbell @ Alice	185.70	185.00			3.16	182.54	3.11	182.59
5-87	Hwy 40 @ LaSalle	187.96	187.38	3.87	184.09	3.88	184.08		
6-87	Guthrie Park	181.86	181.11	4.82	177.04	4.84	177.02		
7-87	CR 4 @ SD 19	197.35	196.72	24.96	172.39	23.54	173.81		
8-87	LaSalle E. of Scott	190.26	189.51	4.05	186.21	4.06	186.20		
9-87	Churchill E. of Plank	191.58	190.66	4.63	186.95	4.66	186.92		
10-87	Air Products	192.77	191.88	5.90	186.87	5.91	186.86		
11-87	Polymer Rd./S.I.R.	182.19	181.49	5.09	177.10	5.10	177.09		
12-87	Polysar	184.04	183.12	17.06	166.98	16.74	167.30		
13-87	Suncor	184.66	183.77	6.57	178.09	6.53	178.13		
14-87	Hwy 40 @ Dow Brine	192.32	191.61	7.75	184.57	7.75	184.57		
15-87	Dow/Churchill @ Vidal	183.69	182.79	6.58	177.11	6.57	177.12		
ESSO									
AQ-1		179.29				3.06	176.23		
AQ-2		182.09				5.46	176.63		
AQ-3		182.49				5.74	176.75		
AQ-4		179.27							
AQ-6		184.28							
AQ-7		190.67							
AQ-8		188.05							
AQ-10		183.34							
AQ-11		182.73				6.11	176.62		
ST. CLAIR RIVER									
1	Point Edward, Ont.				176.31		176.31		176.35
2	Port Huron, Mich.				176.28		176.27		176.31
3	Marysville, Mich.				176.02		176.02		176.05

NOTE: 1) Water levels for 1985 MOE wells & 1986 Environment Canada wells are measured with respect to top of casing.
2) Water levels for the 1987 MOE wells are measured with respect to the top of the Geoguard pump.
3) ESSO water levels provided courtesy of Esso Petroleum Canada.

TABLE F-1 (cont'd)

SARNIA - MOE GROUNDWATER MONITORING PROGRAM
WATER LEVEL RECORD SHEET 1988

		DATE MEASURED		Jan.19/88		Mar.4/88	
Well ID	Location Description	Well Elevation (m. AMSL)	Ground Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)
1-85	ESSO	181.26		4.22	177.04	not meas	N/A
2-85	Mitton St.	184.80		1.84	182.96	1.83	182.97
3-85	Sewage plant	185.11		20.49	164.62	24.87	160.24
4-85	Staffhouse	183.76		5.32	178.44	5.28	178.48
5-85	Hwy.40 @ Churchill	187.62		4.32	183.30	4.37	183.25
6-85	LaSalle Rd.	180.00		2.67	177.34	2.68	177.32
7-85	CIL Plant	178.91		1.32	177.60	1.28	177.63
1-86	POW Park (Deep)	183.20		6.12	177.08	6.18	177.02
2-86	POW Park (Shallow)	183.21		3.23	179.98	3.28	179.93
3-86	POW Park (Pumping)	181.93		4.87	177.06	4.85	177.08
4-86	Victoria Park	182.15		5.11	177.04	5.15	177.00
5-86	Huron @ Tashmoo	183.36		4.06	179.30	4.15	179.21
6-86	Sludge Lagoons	192.00		6.47	185.53	6.66	185.34
7-86	CN Tunnel	184.32		5.34	178.98	5.39	178.93
8-86	Hydro Tower/St.C.R.P.	184.64		7.00	177.64	7.04	177.60
1-87	Germain Park	183.29	182.58	2.03	181.26	2.10	181.19
2-87	Centennial Park	178.24	177.53	1.57	176.67	1.59	176.65
3-87	Talfourd St.	183.41	182.55	2.10	181.31	2.38	181.03
4-87	Campbell @ Alice	185.70	185.00	3.12	182.58	3.15	182.55
5-87	Hwy 40 @ LaSalle	187.96	187.38	3.81	184.15	3.83	184.13
6-87	Guthrie Park	181.86	181.11	4.81	177.05	4.86	177.00
7-87	CR 4 @ SD 19	197.35	196.72	8.76	188.59	11.01	186.34
8-87	LaSalle E. of Scott	190.26	189.51	3.97	186.29	3.99	186.27
9-87	Churchill E. of Plank	191.58	190.66	4.44	187.14	4.33	187.25
10-87	Air Products	192.77	191.88	5.83	186.94	5.85	186.92
11-87	Polymer Rd./S.I.R.	182.19	181.49	5.07	177.12	5.10	177.09
12-87	Polysar	184.04	183.12	11.91	172.13	> 24.4	< 159.64
13-87	Suncor	184.66	183.77	6.55	178.11	6.47	178.19
14-87	Hwy 40 @ Dow Brine	192.32	191.61	7.66	184.66	7.74	184.58
15-87	Dow/Churchill @ Vidal	183.69	182.79	6.55	177.14	6.58	177.11
ESSO							
AQ-1		179.29			175.97		175.97
AQ-2		182.09			176.44		176.49
AQ-3		182.49			176.90		176.59
AQ-4		179.27			175.89		175.87
AQ-6		184.28			182.24		182.33
AQ-7		190.67			186.54		186.62
AQ-8		188.05			182.02		182.09
AQ-10		183.34			176.63		176.68
AQ-11		182.73			176.46		176.50
ST. CLAIR RIVER							
1	Point Edward, Ont.				176.17		176.09
2	Port Huron, Mich.				176.13		176.06
3	Marysville, Mich.				175.89		175.83

NOTE: 1) Water levels for 1985 MOE wells & 1986 Environment Canada wells are measured with respect to top of casing.
2) Water levels for the 1987 MOE wells are measured with respect to the top of the Geoguard pump.
3) ESSO water levels provided courtesy of Esso Petroleum Canada.

TABLE F-1 (cont'd)

SARNIA - MOE GROUNDWATER MONITORING PROGRAM
WATER LEVEL RECORD SHEET 1988

		DATE MEASURED		Mar.21/88		May 31/88	
Well ID	Location Description	Well Elevation (m. AMSL)	Ground Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)	Water Level Measured (m. BTOC)	Water Level Elevation (m. AMSL)
1-85	ESSO	181.26		4.30	176.97	4.18	177.08
2-85	Mitton St.	184.80		1.91	182.89	1.86	182.94
3-85	Sewage plant	185.11		not meas	N/A	22.60	162.51
4-85	Staffhouse	183.76		5.45	178.31	5.32	178.44
5-85	Hwy.40 @ Churchill	187.62		4.45	183.17	4.36	183.26
6-85	LaSalle Rd.	180.00		2.78	177.22	2.67	177.33
7-85	CIL Plant	178.91		1.32	177.59	1.29	177.62
1-86	POW Park (Deep)	183.20		6.22	176.98	6.09	177.11
2-86	POW Park (Shallow)	183.21		3.33	179.88	3.41	179.80
3-86	POW Park (Pumping)	181.93		4.95	176.98	4.83	177.10
4-86	Victoria Park	182.15		5.20	176.95	5.07	177.08
5-86	Huron @ Tashmoo	183.36		4.18	179.18	3.92	179.44
6-86	Sludge Lagoons	192.00		6.86	185.14	6.69	185.31
7-86	CN Tunnel	184.32		5.42	178.90	5.29	179.03
8-86	Hydro Tower/St.C.R.P.	184.64		7.13	177.51	7.02	177.62
1-87	Germain Park	183.29	182.58	2.17	181.12	2.08	181.21
2-87	Centennial Park	178.24	177.53	1.64	176.60	1.53	176.71
3-87	Talfourd St.	183.41	182.55	2.86	180.55	2.00	181.41
4-87	Campbell @ Alice	185.70	185.00	3.23	182.47	3.11	182.59
5-87	Hwy 40 @ LaSalle	187.96	187.38	3.93	184.03	3.82	184.14
6-87	Guthrie Park	181.86	181.11	4.95	176.91	4.82	177.04
7-87	CR 4 @ SD 19	197.35	196.72	9.23	188.12	8.75	188.60
8-87	LaSalle E. of Scott	190.26	189.51	4.09	186.17	3.98	186.28
9-87	Churchill E. of Plank	191.58	190.66	4.55	187.03	4.43	187.15
10-87	Air Products	192.77	191.88	5.96	186.81	5.83	186.94
11-87	Polymer Rd./S.I.R.	182.19	181.49	5.17	177.03	5.05	177.14
12-87	Polysar	184.04	183.12	18.46	165.58	15.75	168.29
13-87	Suncor	184.66	183.77	6.83	177.83	6.61	178.05
14-87	Hwy 40 @ Dow Brine	192.32	191.61	7.79	184.53	7.67	184.65
15-87	Dow/Churchill @ Vidal	183.69	182.79	6.64	177.05	6.52	177.17
ESSO							
AQ-1		179.29			175.86		176.03
AQ-2		182.09			176.41		176.54
AQ-3		182.49			176.51		176.62
AQ-4		179.27			175.82		175.87
AQ-6		184.28			182.22		182.33
AQ-7		190.67			186.61		186.61
AQ-8		188.05			181.99		182.09
AQ-10		183.34			176.60		176.71
AQ-11		182.73			176.42		176.54
ST. CLAIR RIVER							
1	Point Edward, Ont.				176.16		176.23
2	Port Huron, Mich.				176.12		176.19
3	Marysville, Mich.				175.86		175.95

NOTE: 1) Water levels for 1985 MOE wells & 1986 Environment Canada wells are measured with respect to top of casing.
2) Water levels for the 1987 MOE wells are measured with respect to the top of the Geoguard pump.
3) ESSO water levels provided courtesy of Esso Petroleum Canada

APPENDIX G

Groundwater Chemistry
Fresh Water Aquifer

INDEX FOR QA/QC SAMPLES

Fresh Water Aquifer

Sample Identification	Sample Description
87-39-01	Water rinse of drill equipment prior to drilling 87 series wells
P8-86	Distilled water rinse of sampling pump installed in well 8-86
P10-87-BL	Distilled water rinse of sampling pump installed in well 10-87
P10-87-BLF	Distilled water rinse of sampling pump installed in well 10-87 and filtering unit
CITYW	City of Sarnia drinking water
DIW	Distilled water - first sampling round
MSMW-16-87 (Second Quarter)	Distilled water rinse of filtering unit, second sampling round
MSMW-16-87 (Third Quarter)	Distilled water rinse of filtering unit, third sampling round

APPENDIX G1

Fresh Water Aquifer
Field pH, Conductivity, Major Ions, and Total Phenols

Analyzed by:
Ontario Ministry of the Environment
London, Ontario

Parameter ($mg \cdot L^{-1}$)	Monitoring Well Sample 1-85 1st Round	1-85 1st Round Duplicate	1-85 2nd Round	1-85 3rd Round	3-85 2nd Round	3-85 3rd Round
pH	7.65	7.65	7.70	7.70	13.5	12.2
Conductivity (umhos)	1895	1895	1810	—	3990	—
Alkalinity (as $CaCO_3$)	170	166	164	167	712	826
Chloride	745	740	713	819	286	312
Fluoride	1.3	1.3	1.4	1.4	0.6	0.6
Ammonia (as N)	0.75	0.63	0.71	0.69	2.6	2.8
Nitrate (as N)	0.4	0.3	<0.1	<0.1	<0.1	0.1
Sulphate	2.5	2.5	2.5	2.5	10.5	12.0
Phenols ($ug \cdot L^{-1}$)	<1.0	<1.0	<1.0	<1.0	4.0	3.5
Calcium	92	92	86	81	265	121
Magnesium	26	27	24	25	0.1	0.2
Calculated Hardness	338	339	311	305	663	304
Sodium	405	409	407	400	272	282
Potassium	5.8	5.8	6.2	6.0	8.3	7.6
Iron	0.96	0.59	0.74	0.73	0.01	0.01
Manganese	0.03	0.04	0.03	0.03	0.01	0.001

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter ($mg \cdot L^{-1}$)	Monitoring Well Sample					
	4-85 1st Round	4-85 2nd Round	4-85 2nd Round Duplicate	4-85 3rd Round	6-85 1st Round	6-85 2nd Round
pH	8.03*	7.93	7.93	7.75	7.45	7.34
Conductivity (umhos)	---	1910	1910	---	3300	3030
Alkalinity (as $CaCO_3$)	382	394	382	395	289	303
Chloride	722	702	682	509	1654	1400
Fluoride	1.4	1.5	1.5	1.6	0.8	0.9
Ammonia (as N)	0.34	0.43	0.43	0.36	0.79	0.81
Nitrate (as N)	<0.1	<0.1	<0.1	0.1	0.4	<0.1
Sulphate	3.0	2.5	2.5	3.0	3.5	4.0
Phenols ($ug \cdot L^{-1}$)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium	16	128	13.2	17.1	80	62
Magnesium	4.6	4.4	4.5	4.3	20	20
Calculated Hardness	60	50	51	60.3	283	237
Sodium	554	610	632	408	952	885
Potassium	3.2	2.9	2.9	4.8	6.3	6.0
Iron	0.13	0.02	0.01	0.03	0.84	0.21
Manganese	0.01	0.01	0.01	0.01	0.07	0.08

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	6-85 3rd Round	6-85 3rd Round Duplicate	Monitoring Well Sample 7-85 1st Round	7-85 1st Round Duplicate	7-85 2nd Round	7-85 3rd Round	7-85 3rd Round Duplicate
pH	7.40	7.82	8.0*	8.07*	8.37	8.09*	8.08*
Conductivity (umhos)	---	---	---	---	3610	5850*	5800*
Alkalinity (as $CaCO_3$)	315	292	121	87	83	82	88
Chloride	1668	1765	1625	1842	1837	1768	1741
Fluoride	0.9	1.0	0.9	0.9	0.9	0.9	0.9
Ammonia (as N)	0.80	0.82	0.91	0.94	0.96	0.90	0.89
Nitrate (as N)	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sulphate	4.5	4.5	5.5	5.5	5.0	5.0	5.5
Phenols (ug·L^{-1})	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium	76	77	79	79	80	76	75
Magnesium	21	21	25	25	25	26	26
Calculated Hardness	275	277	299	301	306	299	295
Sodium	868	910	980	1065	1034	1098	1070
Potassium	6.2	6.3	7.0	6.9	6.7	6.7	6.7
Iron	0.68	0.66	0.04	0.04	0.01	<0.01	<0.01
Manganese	0.08	0.08	0.03	0.02	0.02	0.02	0.02

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter ($mg\cdot L^{-1}$)	Monitoring Well Sample 1-86 1st Round	1-86 2nd Round	1-86 3rd Round	3-86 1st Round	4-86 1st Round	4-86 2nd Round
pH	7.51	7.90	7.66	7.51	7.61	7.83
Conductivity (umhos)	1190	1110	1590*	1450	1775	1650
Alkalinity (as $CaCO_3$)	162	168	168	166	157	157
Chlori	429	375	363	527	598	622
Fluoride	1.3	1.3	1.3	1.5	1.2	1.3
Ammonia (as N)	0.55	0.62	0.55	0.50	0.67	0.68
Nitrate (as N)	0.4	<0.1	<0.1	0.3	0.3	<0.1
Sulphate	2.0	2.0	2.0	1.0	2.0	3.5
Phenols ($ug\cdot L^{-1}$)	<1.0	<1.0	<1.0	<1.0	2.5	<1.0
Calcium	64	44	50	77	78	62
Magnesium	16	14	14	20	20	20
Calculated Hardness	225	168	182	274	276	235
Sodium	243	245	250	305	306	351
Potassium	4.7	4.3	4.3	5.4	5.3	4.8
Iron	0.98	0.01	0.01	0.02	0.46	0.16
Manganese	0.02	0.04	0.04	0.01	0.04	0.02

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample					
	4-86 3rd Round	5-86 1st Round	5-86 2nd Round	5-86 3rd Round	6-86 1st Round	6-86 2nd Round
pH	7.66	8.10	7.86	8.07	7.88	7.66
Conductivity (umhos)	---	900	910	---	1050	1030
Alkalinity (as $CaCO_3$)	151	258	253	257	210	229
Chloride	719	259	246	296	311	317
Fluoride	1.3	1.4	1.4	1.5	1.0	1.0
Ammonia (as N)	0.61	0.21	0.31	0.24	0.33	0.34
Nitrate (as N)	<0.1	0.1	<0.1	0.1	0.4	<0.1
Sulphate	2.5	2.0	1.5	2.0	1.5	1.0
Phenols (ug·L^{-1})	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium	74	16	17	15	35	27
Magnesium	21	4.6	4.7	4.9	10	9.3
Calculated Hardness	270	59	61	58	130	106
Sodium	357	249	253	255	261	246
Potassium	5.1	2.0	2.4	2.1	2.3	2.0
Iron	1.2	0.27	0.01	0.01	0.40	0.01
Manganese	0.09	0.01	0.01	0.01	0.02	0.03

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample 6-86 3rd Round	7-86 1st Round	7-86 2nd Round	7-86 3rd Round	8-86 1st Round	8-86 2nd Round
pH	7.98	7.59	8.19	7.91	8.00	7.94
Conductivity (umhos)	1500*	600	515	---	1000	1010
Alkalinity (as $CaCO_3$)	216	191	210	200	289	291
Chloride	319	149	135	146	291	317
Fluoride	1.0	1.2	1.4	1.4	1.6	1.7
Ammonia (as N)	0.34	0.29	0.35	0.25	0.04	0.32
Nitrate (as N)	<0.1	0.4	<0.1	<0.1	0.4	<0.1
Sulphate	3.0	2.5	1.0	2.5	1.0	3.0
Phenols (ug·L^{-1})	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium	28	30	22	28	14	9.5
Magnesium	9.6	11	11	12	4.1	3.3
Calculated Hardness	108	121	100	117	53	38
Sodium	274	118	129	124	285	327
Potassium	2.0	3.3	2.9	3.0	1.8	1.7
Iron	0.05	0.12	<0.01	0.01	0.12	0.01
Manganese	0.02	0.01	0.02	0.02	0.01	0.01

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample 8-86 3rd Round	1-87 1st Round	1-87 2nd Round	1-87 3rd Round	2-87 1st Round	2-87 2nd Round
pH	8.10	7.83	8.14	7.78	7.53	7.72
Conductivity (umhos)	---	1050	1090	1430*	2675	2360
Alkalinity (as $CaCO_3$)	285	+	259	259	160	181
Chloride	359	310	293	283	1031	1076
Fluoride	1.8	1.3	1.4	1.3	0.7	0.9
Ammonia (as N)	0.26	+	0.36	0.35	1.1	0.96
Nitrate (as N)	0.1	+	<0.1	<0.1	0.4	<0.1
Sulphate	2.0	+	5.0	3.0	16	4.0
Phenols (ug·L^{-1})	<1.0	+	5.5	1.5	<1.0	<1.0
Calcium	12	+	15	19	107	87
Magnesium	3.6	+	6.6	6.7	33	33
Calculated Hardness	45	+	66	75	405	355
Sodium	316	257	266	284	615	580
Potassium	2.0	2.4	2.2	2.2	20	5.4
Iron	0.13	0.02	0.02	0.05	0.24	0.24
Manganese	0.01	0.02	0.01	0.01	0.08	0.06

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample					
	2-87 2nd Round Duplicate	2-87 3rd Round	2-87 3rd Round Duplicate	3-87 1st Round	3-87 2nd Round	3-87 3rd Round
pH	7.72	7.57	7.57	7.75	8.17	8.41*
Conductivity (umhos)	2360	---	---	1300	995	---
Alkalinity (as $CaCO_3$)	181	176	174	543	489	386
Chloride	1011	1216	1247	216	227	235
Fluoride	0.8	0.8	0.8	0.7	1.0	1.0
Ammonia (as N)	0.96	0.84	0.87	0.24	0.13	0.27
Nitrate (as N)	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Sulphate	3.5	3.5	3.5	4.5	2.5	3.5
Phenols (ug·L^{-1})	<1.0	<1.0	<1.0	<1.0	22.5	<1.0
Calcium	88	99	98	34	34	25
Magnesium	33	34	34	10	9.5	9.3
Calculated Hardness	354	388	387	127	124	101
Sodium	574	580	570	310	322	313
Potassium	5.2	5.3	5.3	3.3	7.0	7.9
Iron	0.29	0.45	0.65	0.35	0.07	0.07
Manganese	0.05	0.05	0.06	0.03	0.02	0.01

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample 4-87 1st Round	 4-87 2nd Round	 4-87 3rd Round	 5-87 1st Round	 5-87 2nd Round	 5-87 3rd Round
pH	7.70	8.05	8.01	8.09	8.17	7.83
Conductivity (umhos)	875	1010	1480*	1725	1910	—
Alkalinity (as $CaCO_3$)	+	306	224	+	307	314
Chloride	355	1337	330	558	614	728
Fluoride	1.1	0.9	1.1	1.0	1.0	1.1
Ammonia (as N)	+	0.82	0.35	+	0.41	0.29
Nitrate (as N)	+	<0.1	<0.1	+	0.1	<0.1
Sulphate	3.5	4.0	2.5	5.5	4.5	4.0
Phenols (ug·L^{-1})	+	10.5	<1.0	+	<1.0	<1.0
Calcium	+	63	19	+	28	27
Magnesium	+	20	6.8	+	8.6	8.4
Calculated Hardness	+	238	76	+	106	103
Sodium	284	905	286	471	474	473
Potassium	2.8	6.1	4.4	3.9	4.5	6.1
Iron	0.02	0.29	0.01	0.03	<0.01	0.01
Manganese	0.02	0.07	0.01	0.02	0.02	0.02

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample 6-87 1st Round	6-87 2nd Round	6-87 2nd Round Duplicate	6-87 3rd Round	7-87 1st Round	7-87 2nd Round
pH	8.20	8.05	8.05	8.26	12.04*	11.78
Conductivity (umhos)	1270	1190	1190	---	---	1710
Alkalinity (as $CaCO_3$)	+	297	303	291	393	275
Chloride	372	390	382	409	311	350
Fluoride	1.6	1.7	1.7	1.8	1.6	1.4
Ammonia (as N)	+	0.34	0.34	0.24	+	0.80
Nitrate (as N)	+	0.1	0.2	<0.1	<0.1	<0.1
Sulphate	3.5	6.0	5.0	4.5	26.5	12.0
Phenols (ug·L^{-1})	+	<1.0	<1.0	<1.0	1.5	1.0
Calcium	+	13	12	11	50	15
Magnesium	+	4.1	4.2	4.3	0.5	0.2
Calculated Hardness	+	49	48	46	128	38
Sodium	+	352	365	346	257	254
Potassium	+	4.4	4.4	10.0	160	152
Iron	+	<0.01	<0.01	2.0	0.14	0.03
Manganese	+	0.01	0.01	0.04	<0.001	<0.001

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample 7-87 3rd Round	 8-87 1st Round	 8-87 2nd Round	 8-87 3rd Round	 9-87 1st Round	 9-87 1st Round Duplicate
pH	11.82	8.00	7.74	7.78	7.42	7.42
Conductivity (umhos)	—	1700	1610	2510*	910	910
Alkalinity (as $CaCO_3$)	206	+	237	238	356	362
Chloride	398	631	623	651	195	196
Fluoride	1.4	1.1	1.1	1.1	1.2	1.2
Ammonia (as N)	0.50	+	0.40	0.37	0.23	0.23
Nitrate (as N)	0.1	+	<0.1	<0.1	0.4	0.3
Sulphate	8.5	9.5	1.5	3.0	6.0	4.5
Phenols (ug·L^{-1})	<1.0	+	<1.0	<1.0	<1.0	<1.0
Calcium	5.7	+	30	28	24	24
Magnesium	0.2	+	9.8	9.7	8.6	8.9
Calculated Hardness	15	+	114	110	96	90
Sodium	262	462	457	495	242	246
Potassium	105	3.0	2.9	7.1	2.3	2.1
Iron	0.01	0.17	0.01	0.06	0.18	0.24
Manganese	0.001	0.02	0.02	0.02	0.02	0.02

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample 9-87 2nd Round	 9-87 3rd Round	 10-87 1st Round	 10-87 2nd Round	 10-87 3rd Round	 11-87 1st Round
pH	7.79	7.61	7.58	7.78	7.74	8.25
Conductivity (umhos)	900	—	680	650	950*	990
Alkalinity (as $CaCO_3$)	354	362	239	270	256	310
Chloride	201	295	163	194	161	240
Fluoride	1.2	1.2	1.2	1.3	1.2	1.8
Ammonia (as N)	0.32	0.25	0.21	0.23	0.27	0.06
Nitrate (as N)	<0.1	<0.1	0.4	<0.1	<0.1	0.4
Sulphate	2.5	2.0	3.5	1.0	2.0	2.5
Phenols (ug·L^{-1})	10.5	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium	18	25	20	20	19	14
Magnesium	7.8	9.1	6.9	6.9	7.0	4.1
Calculated Hardness	76	99	80	77	76	51
Sodium	242	264	140	163	186	285
Potassium	1.9	2.2	5.0	2.1	5.6	4.0
Iron	0.02	0.31	0.11	<0.01	0.01	0.19
Manganese	0.02	0.02	0.02	0.02	0.01	0.01

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample 11-87 2nd Round	 11-87 3rd Round	 12-87 1st Round	 12-87 2nd Round	 12-87 3rd Round	 13-87 1st Round
pH	7.90	8.25	12.67*	12.16	12.09	7.89
Conductivity (umhos)	995	---	7000	5100	---	950
Alkalinity (as $CaCO_3$)	319	322	1152	954	670	245
Chloride	261	447	269	473	691	265
Fluoride	1.9	2.0	1.6	1.6	1.4	1.7
Ammonia (as N)	0.33	0.34	+	2.0	1.9	0.01
Nitrate (as N)	0.2	0.1	<0.1	<0.1	<0.1	0.4
Sulphate	2.5	2.0	21	12	9.0	5.0
Phenols (ug·L^{-1})	13.5	<1.0	4.0	4.0	2.5	3.0
Calcium	12	11	214	140	110	15
Magnesium	4.2	4.0	0.4	0.2	0.3	3.8
Calculated Hardness	47	44	537	350	275	52
Sodium	283	312	480	499	559	270
Potassium	2.5	3.6	426	277	206	2.9
Iron	0.02	<0.01	0.04	<0.01	0.01	0.03
Manganese	0.005	0.003	0.002	<0.001	0.001	0.01

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter ($mg \cdot L^{-1}$)	Monitoring Well Sample 13-87 2nd Round	13-87 3rd Round	14-87 1st Round	14-87 2nd Round	14-87 3rd Round	15-87 1st Round
pH	7.99	8.20	7.92*	7.83	7.93	8.43
Conductivity (umhos)	1010	---	1710	1700	—	840
Alkalinity (as $CaCO_3$)	269	260	201	211	212	206
Chloride	310	324	615	644	739	266
Fluoride	1.8	1.9	1.2	1.2	1.4	1.5
Ammonia (as N)	0.32	0.16	0.41	0.34	0.36	0.40
Nitrate (as N)	<0.1	0.2	0.4	0.2	0.1	0.4
Sulphate	2.0	4.0	2.5	3.0	3.0	10
Phenols ($ug \cdot L^{-1}$)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium	13	16	26	21	23	14
Magnesium	4.2	4.5	7.8	7.5	7.6	4.3
Calculated Hardness	49	58	98	84	89	52
Sodium	292	283	561	460	630	235
Potassium	2.4	2.8	2.9	2.4	2.6	2.6
Iron	0.01	0.09	0.18	0.01	<0.01	0.12
Manganese	0.01	0.01	0.02	0.02	0.02	0.01

+ Not reported
* Laboratory measurement
- Analysis not performed

Parameter (mg·L^{-1})	Monitoring Well Sample		
	15-87 2nd Round	15-87 4th Round	15-87 4th Round Duplicate
pH	8.08	8.0	8.0
Conductivity (umhos)	940	930	930
Alkalinity (as $CaCO_3$)	294	X	114
Chloride	271	X	255
Fluoride	1.4	X	+
Ammonia (as N)	0.33	X	17.1
Nitrate (as N)	<0.1	X	<0.01
Sulphate	4.0	X	4.0
Phenols (ug·L^{-1})	<1.0	<1.0	13.5
Calcium	20	21	18
Magnesium	6.3	8.0	7.2
Calculated Hardness	76	86	75
Sodium	294	258	254
Potassium	2.3	2.4	2.3
Iron	0.01	<0.01	<0.01
Manganese	0.01	0.01	0.01

+ Not reported
* Laboratory measurement
- Analysis not performed
X Anion bottle broken in transit

MOE - SARNIA
FRESH WATER AQUIFER - QA/QC

Parameter (mg/L)	1st Round Pump Blank of 8-86	1st Round Pump Blank of 10-87	1st Round Pump and Filter Blank of 10-87	1st Round City of Sarnia Water	1st Round Distilled Water	1st Round Drill Rinse	2nd Round Equipment Rinse	3rd Round D.I. Water	3rd Round Equipment Rinse
pH	8.30*	8.03*	7.60*	7.93*	-	7.93*	8.31*	8.98*	9.16*
Conductivity (umhos)	-	-	-	-	-	-	-	-	-
Alkalinity (as CaCO3)	8.4	6.7	6.5	72	9.3	74	9.71	<0.01	5.7
Chloride	29	11	30	6.8	.5	17	<0.01	.13	<0.01
Fluoride	<0.1	<0.1	<0.1	1.1	.1	1.2	<0.10	<0.10	<0.10
Ammonia (as N)	.44	.02	.01	<0.005	.005	.01	.03	.03	.03
Nitrate (as N)	.4	.4	.3	.5	.6	.5	.1	.1	.1
Sulphate	<0.5	<0.5	.5	21	2.5	24	<0.5	0.5	<0.5
Phenols (ug/L)	<1.0	<1.0	<1.0	<1.0	<1.0	-	2.5	<1.0	<1.0
Calcium	-	2.9	2.1	27	2.76	33	.5	.5	.7
Magnesium	-	.4	.2	7.3	.2	7.9	.4	.3	.2
Calculated Hardness	-	9	6	97	8	115	3	2.7	2.5
Sodium	-	18	.1	3	.4	70	.4	.4	.4
Potassium	-	1.7	.3	.9	.8	9.5	.07	.14	.32
Iron	-	.02	.01	.91	.01	.13	<0.01	<0.01	<0.01
Manganese	-	<0.001	<0.001	.01	<0.001	.02	.001	<0.001	<0.001

* Laboratory measurement
- Analysis not performed

APPENDIX G2

Fresh Water Aquifer
Metals

Analyses by:

Ontario Ministry of the Environment
Rexdale, Ontario

NB: First Round Analyses Reported in mg/L
Second and Third Round Analyses Reported in ug/L

	Monitoring Well Sample					
Parameter (* analysis in mg/L)	1-85 1st Round *	1-85 1st Round Duplicate*	1-85 2nd Round	1-85 3rd Round	3-85 2nd Round	3-85 3rd Round
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CE5	.002	.001	3.30	1.70	4.20	2.00
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CE5	<.001<	.001	<.10<W	.83<T	13.00	.13<T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CE5	<.003<	<.003<	.22	.17<T	.66	4.40
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CE5	.001	.050	1.10	2.50	8.70	10.00
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CE5	<.001<	.014	25.00	24.00	.50	.19<T
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CE5	—	—	.11<T	.06<T	—	.03<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CE5	<.001<	<.001<	14.00	.22	49.00	<.05<W
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CE5	—	—	1900.00	170.00	—	.46
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CE5	—	—	740.00	780.00	—	28.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CE5	<.0003<	<.0003<	.12<T	.12<T	5.00	.05<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CE5	<.001<	<.001<	.13<T	.21<T	.54	.11<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CE5	<.001<	.002	.62<T	.64<T	1.00	.25<T
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CE5	<.001<	<.001<	5.30	5.20	.71<T	<.02<W
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CE5	<.001<	<.001<	6.80<T	15.00	3.20<T	3.20<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CE5	<.001<	.089	1700.00	1700.00	1300.00	.75<T
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CE5	<.001<	.001	<.01<W	.08	2.80	.07<T

(T THIS LOW MEASUREMENT IS TENTATIVE FOR INFO ONLY

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Parameter (* analysis in mg/L)	Monitoring Well Sample 4-85 1st Round *	4-85 2nd Round	4-85 2nd Round Duplicate	6-85 1st Round *	6-85 2nd Round
COPPER, UNF.TOTAL. .CUUT ,UG/L as Cu (Copper) 001CE5	<.001<	3.60	3.60	<.005<	5.20
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CE5	.001	1.30<T	1.20<T	.051	1.40
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CE5	<.003<	.39	.03<T	<.015<	.19<T
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CE5	<.001<	3.80	.83<T	<.010<	1.30
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CE5	.013	8.20	8.10	.062	49.00
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CE5	—	—	—	—	—
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CE5	<.001<	1.20	1.80	<.001<	7.80
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CE5	—	—	—	—	—
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CE5	—	—	—	—	—
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CE5	<.0003<	.08<T	.05<T	<.0015<	.11<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CE5	.004	.09<T	.11<T	.110	.37<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CE5	.002	.43<T	.36<T	.052	.16<T
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CE5	.007	4.70	4.70	.005	.09<T
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CE5	<.001<	3.70<T	4.10<T	<.001<	8.50<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CE5	.240	220.00	220.00	1.400	1100.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CE5	<.001<	1.50	1.60	<.005<	7.30

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— ANALYSIS NOT PERFORMED

Parameter (* analysis in mg/L)	6-85 3rd Round	6-85 3rd Round Duplicate	7-85 1st Round *	7-85 1st Round Duplicate *	7-85 2nd Round
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CE5	5.00	4.80	<.001<	<.003<	6.50
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CE5	2.40	3.70	.004	<.015<	1.70
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CE5	1.10	1.20	<.003<	<.030<	.12<T
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CE5	16.00	20.00	<.001<	<.003<	1.10
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CE5	65.00	55.00	.023	.054	14.00
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CE5	.16<T	.09<T	—	—	.08<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CE5	<.05<M	<.05<M	.001	—	3.50
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CE5	6000.00	5100.00	—	—	490.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CE5	1600.00	1200.00	—	—	940.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CE5	<.05<M	.10<T	<.0003<	<.0030<	.16<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CE5	.04<T	.07<T	.008	.008	.22<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CE5	2.80	2.60	.006	<.005<	.28<T
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CE5	.64	<.02<M	.014	.014	11.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CE5	24.00	14.00	<.001<	<.001<	3.70<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CE5	1500.00	1300.00	2.400	1.111	1800.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CE5	<.01<M	<.01<M	<.001<	.001	<.01<W

<T THIS LOW MEASUREMENT IS TENTATIVE FOR INFO ONLY

[redacted] 0"[redacted]AL([redacted]FP[redacted]ED [redacted] MI[redacted]ME[redacted]RAB[redacted]AM[redacted] [redacted] [redacted] [redacted] A[redacted]SIS[redacted] PF[redacted]IMF[redacted] [redacted] [redacted]

Parameter (* analyses in mg/L)	Monitoring Well Sample				
	7-85 3rd Round	7-85 3rd Round Duplicate	1-86 1st Round *	1-86 2nd Round	1-86 3rd Round
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CES	3.20	3.30	<.005<	1.90	.92<T
NICKEL, UNF.TOTAL NIUT ,UG/L as NI (Nickel) 001CES	1.50	1.60	.006	1.20<T	.63<T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CES	.26	.25	<.015<	.42	.30
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CES	.69<T	.72<T	<.010<	.95<T	.51<T
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CES	18.00	18.00	.037	32.00	34.00
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CES	.08<T	.12<T	—	—	.07<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CES	<.01<W	<.01<W	.005	7.50	<.05<W
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CES	580.00	590.00	—	—	570.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CES	1000.00	1000.00	—	—	830.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CES	.24<T	.26<T	<.0015<	.28<T	.37<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CES	.10<T	.09<T	.014	.26<T	.10<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CES	1.20	.66<T	.008	.26<T	.46<T
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CES	13.00	13.00	.020	21.00	23.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CES	8.80<T	8.20<T	<.001<	3.00<T	5.90<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CES	2000.00	2000.00	1.400	1200.00	1100.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CES	.14	<.01<W	<.005<	.82	<.01<W

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— ANALYSIS NOT PERFORMED

Parameter (* analyses in mg/L)	Monitoring Well Sample 3-86 1st Round *	4-86 1st Round *	4-86 2nd Round	4-86 3rd Round	5-86 1st Round *
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CE5	<.001<	<.005<	2.70	1.50	<.001<
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CE5	.008	.008	2.20	.42<T	<.001<
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CE5	<.003<	<.015<	1.40	.22	<.003<
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CE5	.019	<.010<	15.00	.71<T	<.001<
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CE5	.010	.020	17.00	20.00	.010
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CE5	—	—	—	.07<T	—
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CE5	<.001<	.001	4.00	<.01<W	<.001<
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CE5	—	—	—	97.00	—
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CE5	—	—	—	790.00	—
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CE5	<.0003<	<.0015<	.22<T	.20<T	<.0003<
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CE5	.014	.017	.27<T	.15<T	.002
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CE5	.008	.009	.34<T	.67<T	.001
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CE5	.014	.013	11.00	11.00	.023
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CE5	<.001<	<.001<	6.70<T	10.00	<.001<
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CE5	1.600	1.700	1600.00	1600.00	.280
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CE5	<.001<	<.005<	1.50	.13	<.001<

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Parameter (* analyses in mg/L)	5-86 2nd Round	5-86 3rd Round	Monitoring Well Sample 6-86 1st Round *	6-86 2nd Round	6-86 3rd Round
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CE5	2.10	1.20	<.005<	1.90	1.00
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CE5	<.10<W	.41<T	<.005<	1.10<T	.41<T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CE5	.18<T	.37	<.015<	.89	.17<T
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CE5	.75<T	.15<T	<.010<	1.30	8.00
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CE5	10.00	8.50	.023	18.00	19.00
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CE5	<.02<W	.07<T	—	—	.10<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CE5	.75<T	<.05<W	<.001<	1.00	<.05<W
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CE5	86.00	87.00	—	—	190.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CE5	980.00	960.00	—	—	870.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CE5	.17<T	.37<T	<.0015<	.93	.29<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CE5	.11<T	.09<T	<.005<	.16<T	.07<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CE5	1.90	1.10	<.005<	.13<T	.89<T
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CE5	21.00	21.00	.019	15.00	15.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CE5	2.80<T	4.40<T	<.001<	3.20<T	5.40<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CE5	320.00	290.00	.670	615.00	620.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CE5	<.01<W	<.01<W	<.005<	.51	<.01<W

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— ANALYSIS NOT PERFORMED

Parameter (* analyses in mg/L)	Monitoring Well Sample 7-86 1st Round *	7-86 2nd Round	7-86 3rd Round	8-86 1st Round *	8-86 2nd Round	8-86 3rd Round
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CE5	<.005<	1.10	.44<T	.002	2.20	2.70
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CE5	<.005<	.39<T	.48<T	.003	<.10<W	2.60
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CE5	<.015<	.85	.29	<.003<	1.00	1.40
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CE5	<.010<	1.30	.97<T	<.001<	.79<T	23.00
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CE5	.014	15.00	15.00	.010	5.40	9.50
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CE5	—	—	.15<T	—	—	.33<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CE5	.005	4.90	3.60	.002	.91<T	<.05<W
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CE5	—	—	260.00	—	—	440.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CE5	—	—	920.00	—	—	1300.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CE5	<.0015<	.34<T	.36<T	<.0003<	1.10	.75
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CE5	<.005<	.19<T	.10<T	.006	.13<T	.31<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CE5	<.005<	.42<T	.43<T	.003	.70<T	2.90
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CE5	.029	22.00	22.00	.046	32.00	41.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CE5	<.001<	2.10<T	3.30<T	<.001<	2.60<T	7.90<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CE5	.800	780.00	740.00	.240	250.00	350.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CE5	<.005<	.30<T	.04<T	.002	.70	1.40

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Parameter (* analyses in mg/L)	Monitoring Well Sample					
	1-87 1st Round *	1-87 2nd Round	1-87 3rd Round	2-87 1st Round *	2-87 2nd Round	2-87 2nd Round Duplicate
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CE5	<.005<	2.20	1.10	<.005<	3.80	3.90
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CE5	<.005<	.62<T	.85<T	.016	1.50	1.30<T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CE5	<.015<	.68	.22	<.015<	.47	.36
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CE5	.014	24.00	2.50	<.010<	1.30	1.10
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CE5	.022	9.30	12.00	.072	37.00	37.00
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CE5	—	—	.10<T	—	—	—
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CE5	.002	3.40	<.05<W	.002	5.00	5.10
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CE5	—	—	200.00	—	—	—
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CE5	—	—	920.00	—	—	—
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CE5	<.0015<	.44<T	.57	<.0015<	.26<T	.15<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CE5	<.005<	.21<T	.14<T	.035	.41<T	.47<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CE5	<.005<	.46<T	1.20	.021	.36<T	.22<T
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CE5	.039	33.00	32.00	.010	3.00	2.90
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CE5	<.001<	2.50<T	5.10<T	<.001<	6.20<T	5.80<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CE5	.520	470.00	450.00	2.400	1900.00	1900.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CE5	<.005<	1.20	.18<T	<.005<	1.70	1.30

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— ANALYSIS NOT PERFORMED

Parameter (* analyses in mg/L)	2-87 3rd Round	2-87 3rd Round Duplicate	Monitoring Well Sample 3-87 1st Round *	3-87 2nd Round	3-87 3rd Round
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CES	1.90	2.20	<.001<	2.60	1.40
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CES	.87<T	1.10<T	.001	.12<T	.87<T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CES	.18<T	.18<T	<.003<	.13<T	.19<T
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CES	.92<T	.87<T	<.001<	23.00	.58<T
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CES	40.00	41.00	.030	17.00	12.00
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CES	.17<T	.11<T	—	.04<T	.08<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CES	<.01<W	<.01<W	.002	6.60	<.05<W
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CES	200.00	210.00	—	240.00	200.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CES	970.00	1000.00	—	1400.00	1300.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CES	.09<T	.11<T	<.0003<	.11<T	.16<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CES	.16<T	.21<T	.003	.15<T	.25<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CES	2.90	1.30	.003	.57<T	2.50
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CES	3.20	3.40	.006	11.00	11.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CES	13.00	12.00	<.001<	2.60<T	4.80<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CES	2000.00	2000.00	.650	720.00	730.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CES	.04	.05	<.001<	.13<T	<.01<W

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— ANALYSIS NOT PERFORMED

Parameter (*analyses in mg/L)	4-87 1st Round *	4-87 2nd Round	Monitoring Well Sample 4-87 3rd Round	5-87 1st Round *	5-87 2nd Round	5-87 3rd Round
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CES	.011	2.30	.91<T	<.005<	3.00	1.70
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CES	.002	.75<T	.74<T	<.005<	.71<T	.88<T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CES	<.003<	.55	.21	<.015<	.51	.14<T
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CES	.006	22.00	1.90	<.010<	.87<T	.43<T
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CES	.016	13.00	12.00	.018	14.00	14.00
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CES	—	—	.20<T	—	—	.03<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CES	<.001<	1.80	<.05<W	<.001<	1.90	<.01<W
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CES	—	—	120.00	—	—	220.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CES	—	—	800.00	—	—	1300.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CES	<.0003<	.40<T	.47<T	<.0015<	.23<T	.16<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CES	.002	.19<T	.12<T	<.005<	.15<T	.10<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CES	.002	.81<T	.98<T	<.005<	.28<T	1.60
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CES	.030	28.00	28.00	.016	7.70	7.70
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CES	<.001<	2.36<T	5.10<T	<.001<	2.70<T	5.40<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CES	.420	491.00	460.00	.580	540.00	570.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CES	<.001<	.77	<.01<W	<.005<	1.10	.08

<T THIS LOW MEASUREMENT IS TENTATIVE, FOR INFO ONLY

[redacted]

Parameter (* analyses in mg/L)	Monitoring Well Sample					
	6-87 1st Round *	6-87 2nd Round	6-87 2nd Round Duplicate	6-87 3rd Round	7-87 1st Round *	7-87 2nd Round
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CES	<.001<	2.60	2.50	1.80	—	2.70
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CES	.004	<.10<W	.13<T	1.90	—	.23<T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CES	<.003<	1.10	.83	.43	—	.27
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CES	.004	.80<T	.40<T	2.50	—	.51<T
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CES	.012	5.60	5.70	14.00	—	.50
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CES	—	—	—	.07<T	—	.02<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CES	<.001<	1.20	1.10	<.05<W	—	.89<T
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CES	—	—	—	360.00	—	66.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CES	—	—	—	1100.00	—	460.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CES	<.0003<	.15<T	.11<T	.11<T	—	.46<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CES	.008	.21<T	.12<T	.50<T	.002	.31<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CES	.005	.45<T	.70<T	2.90	—	.74<T
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CES	.011	5.20	5.20	5.00	.066	67.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CES	<.001<	1.30<T	1.80<T	4.30<T	—	3.00<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CES	.250	260.00	260.00	210.00	.440	440.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CES	<.001<	.60	.66	1.80	.002	.50

<T THIS LOW MEASUREMENT IS TENTATIVE. FOR INFO ONLY
<W "ZERO". VALUE REPORTED IS MIN. MEASURABLE AMOUNT

— ANALYSIS NOT PERFORMED

Parameter (* analyses in mg/L)	7-87 3rd Round	8-87 1st Round *	8-87 2nd Round	8-87 3rd Round	9-87 1st Round *	9-87 1st Round Duplicate*
	Monitoring Well Sample					
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CES	2.90	.008	4.60	1.50	.009	<.001<
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CES	1.10<T	.001	.60<T	.88<T	.036	.003
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CES	1.10	<.003<	.80	.11<T	<.003<	<.003<
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CES	23.00	.008	.56<T	.49<T	.005	<.001<
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CES	.83	.032	14.00	13.00	.025	.022
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CES	.17<T	—	—	.10<T	—	—
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CES	<.05<W	<.001<	1.80	<.01<W	<.001<	<.001<
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CES	60.00	—	—	180.00	—	—
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CES	490.00	—	—	1000.00	—	—
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CES	1.20	<.0003<	.49<T	.16<T	<.0003<	<.0003<
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CES	.38<T	.003	.19<T	.13<T	.004	.003
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CES	1.40	.002	.70<T	1.20	.002	.002
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CES	76.00	.011	7.10	8.20	.010	.010
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CES	2.40<T	<.001<	2.90<T	5.40<T	<.001<	<.001<
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CES	380.00	.710	600.00	600.00	.560	.560
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CES	.62	<.001<	1.10	.11	<.001<	<.001<

<T THIS LOW MEASUREMENT IS TENTATIVE. FOR INFO ONLY

<W "ZERO" VALUE REPORTED [illegible] MI[illegible] MEA[illegible]AB[illegible] AMC[illegible] AN[illegible]SIS [illegible] PER[illegible]MED

Parameter (* analyses in mg/L)	Monitoring Well Sample 9-87 2nd Round	9-87 3rd Round	10-87 1st Round*	10-87 2nd Round	10-87 3rd Round	11-87 1st Round *
COPPER, UNF.TOTAL. .CUUT ,UG/L as Cu (Copper) 001CES	2.60	1.00	(.005(	2.80	.59(T	(.005(
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CES	.11(T	.68(T	(.005(	.67(T	.34(T	.018
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CES	.68	.27	(.015(	1.60	.18(T	(.015(
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CES	1.50	.80(T	(.010(	2.00	.40(T	(.010(
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CES	12.00	15.00	.023	14.00	11.00	.013
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CES	—	.03(T	—	—	.06(T	—
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CES	.60(T	(.05(W	(.001(	.16(T	(.05(W	.001
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CES	—	160.00	—	—	96.00	—
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CES	—	1400.00	—	—	1000.00	—
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CES	.05(T	.09(T	(.0015(	.24(T	.19(T	(.0015(
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CES	.14(T	.19(T	(.005(	.16(T	.09(T	.006
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CES	.64(T	1.00	(.005(	.37(T	1.10	.031
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CES	4.50	5.10	.025	11.00	12.00	.034
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CES	2.00(T	4.60(T	(.001(	2.70(T	3.90(T	(.001(
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CES	600.00	640.00	.520	500.00	480.00	.310
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CES	.34(T	.39(T	(.005(	.27(T	(.01(W	(.005(

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— ANALYSIS NOT PERFORMED

Parameter (* analyses in mg/L)	Monitoring Well Sample 11-87 2nd Round	11-87 3rd Round	12-87 1st Round*	12-87 2nd Round	12-87 3rd Round
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CES	2.30	1.60	—	4.00	2.00
NICKEL, UNF.TOTAL NIUT ,UG/L as Ni (Nickel) 001CES	.22<T	.63<T	—	<.10<W	.57<T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CES	.15<T	.39	—	.26	.24
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CES	1.60	.48<T	—	.95<T	1.10
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CES	3.80	4.00	—	.72	.61
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CES	—	.08<T	—	.02<T	.03<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CES	.86<T	<.05<W	—	3.00	<.01<W
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CES	—	290.00	—	340.00	320.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CES	—	1000.00	—	220.00	220.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CES	.37<T	.62	—	.27<T	.48<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CES	.13<T	.11<T	.008	.68<T	.49<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CES	.66<T	3.00	—	.31<T	.45<T
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CES	27.00	30.00	.025	34.00	27.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CES	2.00<T	4.40<T	—	2.90<T	5.90<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CES	290.00	310.00	1.111	2800.00	2300.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CES	.59	<.01<W	.002	.33<T	.12

<T THIS LOW MEASUREMENT IS TENTATIVE. FOR INFO ONLY

(U "ZERO" VALUE REPORTED IS MIN [illegible] MEA[illegible]ABL[illegible] AMO[illegible] [illegible] A[illegible]SIS [illegible] PE[illegible]

Parameter (* analyses in mg/L)	13-87 1st Round *	13-87 2nd Round	13-87 3rd Round	14-87 1st Round *	14-87 2nd Round	14-87 3rd Round
	Monitoring Well Sample					
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CES	<.005<	2.20	1.40	<.005<	3.60	2.20
NICKEL, UNF.TOTAL NIUT ,UG/L as NI (Nickel) 001CES	<.005<	.74<T	.93<T	<.005<	.69<T	1.20<T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CES	<.015<	.91	.22	<.015<	.02<T	.21
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CES	.014	6.10	.52<T	<.010<	.16<T	.46<T
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CES	.011	7.60	8.20	.015	8.20	12.00
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CES	—	—	.10<T	—	—	.14<T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CES	.001	1.20	<.05<W	.001	2.60	<.05<W
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CES	—	—	360.00	—	—	330.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CES	—	—	910.00	—	—	950.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CES	<.0015<	.34<T	.41<T	<.0015<	.18<T	.24<T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CES	.007	.10<T	.14<T	.007	.11<T	.12<T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CES	.006	.16<T	1.40	<.005<	1.70	1.40
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CES	.035	27.00	29.00	.016	12.00	13.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CES	<.001<	3.10<T	4.00<T	<.001<	2.90<T	5.80<T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CES	.280	310.00	320.00	.550	500.00	510.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CES	<.005<	.79	<.01<W	<.005<	1.30	<.01<W

<T THIS LOW MEASUREMENT IS TENTATIVE. FOR INFO ONLY
<W "ZERO". VALUE REPORTED IS MIN. MEASURABLE AMOUNT

— ANALYSIS NOT PERFORMED

Parameter (* analyses in mg/L)	15-87 1st Round *	15-87 2nd Round	15-87 4th Round	15-87 4th Round Duplicate
	Monitoring Well Sample			
COPPER, UNF.TOTAL. CUUT ,UG/L as Cu (Copper) 001CE5	(.005(	2.30	4.70	5.10
NICKEL, UNF.TOTAL NIUT ,UG/L as NI (Nickel) 001CE5	(.005(	.48(T	1.50(T	1.60(T
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CE5	(.015(	.26	.39	.28
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CE5	(.010(	1.30	1.80	1.70
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CE5	(.005(	8.50	9.80	10.00
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CE5	—	.09(T	.09(T	.11(T
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CE5	.005	1.20	.98(T	.95(T
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CE5	—	430.00	480.00	510.00
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CE5	—	1000.00	1000.00	1200.00
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CE5	(.0015(	.17(T	.11(T	.18(T
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CE5	.007	.09(T	.10(T	.11(T
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CE5	(.005(	.60(T	1.20	8.10
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CE5	.022	12.00	12.00	13.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CE5	(.001(	2.40(T	3.20(T	3.50(T
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CE5	.290	410.00	450.00	490.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CE5	(.005(	(.01(W	(.01(W	(.01(W

(T THIS LOW MEASUREMENT IS TENTATIVE FOR INFO ONLY

[illegible] [illegible]RO[illegible]VAL[illegible]RE[illegible]TE[illegible] M[illegible] ME[illegible]RA[illegible] A[illegible]T [illegible] [illegible] [illegible] [illegible]YSIS [illegible] PE[illegible]RME[illegible] [illegible] [illegible]

Parameter (mg·L^{-1})	1st Round Pump Blank of 8-86	1st Round Pump Blank of 10-87	1st Round Pump and Filter Blank of 10-87	1st Round City of Sarnia Water	1st Round Distilled Water	1st Round Drill Rinse
COPPER, UNF.TOTAL. CUUT ,MG/L as Cu (Copper) 522AE2	.005	<.005<	<.005<	.001	—	<.005<
NICKEL, UNF.TOTAL NIUT ,MG/L as Ni (Nickel) 522AE2	.009	<.005<	<.005<	.011	—	<.005<
LEAD, UNF.TOTAL PBUT ,MG/L as Pb (Lead) 522AE2	<.003<	<.015<	<.015<	<.003<	—	<.015<
ZINC, UNF.TOTAL ZNUT ,MG/L as Zn (Zinc) 522AE2	.005	<.010<	<.010<	<.001<	—	<.010<
MANGANESE, UNF.TOTAL MNUT ,MG/L as Mn Manganese 522AE2	.001	<.005<	<.005<	.031	—	.028
ARSENIC, UNF.TOTAL ASUT ,MG/L as As (Arsenic) 540AF3	<.001<	<.001<	<.001<	.014	—	<.001<
CADMIUM, UNF.TOTAL CDUT ,MG/L as Cd (Cadmium) 522AE2	<.0003<	<.0015<	<.0015<	<.0003<	—	<.0015<
COBALT, UNF. TOTAL COUT ,MG/L as Co (Cobalt) 522AE2	<.001<	<.005<	<.005<	.025	<.001<	<.005<
CHROMIUM, UNF.TOTAL CRUT ,MG/L as Cr (Chromium) 522AE2	.002	<.005<	<.005<	.013	—	<.005<
MOLYBDENUM, UNF.TOTAL MOUT ,MG/L as Mo Molybdenum 522AE2	<.001<	<.005<	<.005<	.007	<.001<	.006
SELENIUM, UNF.TOTAL SEUT ,MG/L as Se (Selenium) 540AF3	<.001<	<.001<	<.001<	<.001<	—	<.001<
STRONTIUM, UNF. TOTAL SRUT ,MG/L as Sr Strontium 522AE2	.005	<.005<	<.005<	1.900	<.001<	.250
VANADIUM,UNF,TOTAL VVUT ,MG/L as V (Vanadium) 522AE2	<.001<	<.005<	<.005<	<.001<	<.001<	<.005<

— Analysis not performed

Parameter *	2nd Round Equipment Rinse	3rd Round D.I. Water	3rd Round Equipment Rinse
COPPER, UNF.TOTAL. .CUUT ,UG/L as Cu (Copper) 001CE5	.88<T	3.30	—
NICKEL, UNF.TOTAL NIUT ,UG/L as NI (Nickel) 001CE5	.20<T	.88<T	—
LEAD, UNF.TOTAL PBUT ,UG/L as Pb (Lead) 001CE5	3.80	4.10	—
ZINC, UNF.TOTAL ZNUT ,UG/L as Zn (Zinc) 001CE5	14.00	29.00	—
MANGANESE, UNF.TOTAL MNUT ,UG/L as Mn Manganese 001CE5	.40<T	.68	—
SILVER, UNF.TOTAL AGUT ,UG/L as AG (SILVER) 001CE5	—	.24<T	—
ARSENIC, UNF.TOTAL ASUT ,UG/L as As (Arsenic) 001CE5	<.05<W	.65<T	—
BARIUM, UNF.TOTAL BAUT ,UG/L as BA (BARIUM) 001CE5	—	3.40	—
BORON, UNF.TOTAL BBUT ,UG/L as B (Boron) 001CE5	—	34.00	—
CADMIUM, UNF.TOTAL CDUT ,UG/L as Cd (Cadmium) 001CE5	.06<T	.12<T	—
COBALT, UNF. TOTAL COUT ,UG/L as Co (Cobalt) 001CE5	.11<T	.10<T	<.02<W
CHROMIUM, UNF.TOTAL CRUT ,UG/L as Cr (Chromium) 001CE5	.46<T	.51<T	—
MOLYBDENUM, UNF.TOTAL MOUT ,UG/L as Mo Molybdenum 001CE5	.03<T	.15<T	55.00
SELENIUM, UNF.TOTAL SEUT ,UG/L as Se (Selenium) 001CE5	.31<T	3.70<T	—
STRONTIUM, UNF. TOTAL SRUT ,UG/L as SR (STRONTIUM 001CE5	1.10	5.00	1300.00
VANADIUM,UNF,TOTAL VVUT ,UG/L as V (Vanadium) 001CE5	.05<T	.12<T	3.00

[redacted]

APPENDIX G3

Fresh Water Aquifer
Volatile Organics

Analyses by:

Barringer-Magenta Ltd.,
Rexdale, Ontario

CLIENT: INTERA TECHNOLOGIES LTD. DATE: PAGE II/II
W.O. #

VOLATILE ORGANICS RESULTS ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-1-85 1ST QTR	MSMW-1-85 1ST QTR DUPLICATE	MSMW-1-85 2ND QTR	MSMW-1-85 3RD QTR	MSMW-3-85 2ND QTR	MSMW-3-85 3RD QTR	MSMW-4-85 1ST QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	‡.8
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	‡2.9
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	‡.7	9.1	10.7	‡.6	‡.4	‡.1	ND
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	ND	‡.2	4.3	4.4	‡.3	1.0	ND
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	‡.1	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	‡.2	ND	‡.3	‡.2	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	ND	‡.3	ND	11.4	11.3	2.2
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	‡.8	‡.4	‡.4	‡.2	10.9	10.2	1.9
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	‡.1	ND	ND	‡.2	‡.2	‡.1
34	M-XYLENE & P-XYLENE	.5	‡.1	‡.3	‡.1	ND	0.5	‡.4	‡.2
35	O-XYLENE	.5	ND	‡.2	ND	ND	‡.4	‡.3	‡.1
36	STYRENE	.5	ND	‡.3	‡.1	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-1-85 1ST QTR	MSMW-1-85 1ST QTR DUPLICATE	MSMW-1-85 2ND QTR	MSMW-1-85 3RD QTR	MSMW-3-85 2ND QTR	MSMW-3-85 3RD QTR	MSMW-4-85 1ST QTR
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	*.1	ND	ND	ND	ND	*.1
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	*.1	ND	ND	*.2	*.1	*.1
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1.3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	*.1	*.1	ND
49	1.4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1.3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1.4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	92%	101%	97%	89%	94%	97%	98%
58	1,4-DICHLOROBUTANE	10 UG/L	92%	104%	84%	91%	99%	111%	93%
59	4-BROMOFLUOROBENZENE	2 UG/L	88%	101%	93%	93%	102%	86%	87%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-85 2ND QTR	MSMW-4-85 2ND QTR DUPLICATE	MSMW-4-85 2ND QTR DUPL(RPT)	MSMW-4-85 3RD QTR	MSMW-6-85 1ST QTR	MSMW-6-85 1ST QTR QC-REPEAT	MSMW-6-85 2ND QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND	#.6	#.5	#.1	ND	ND	#.9
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	#.3	#.2	#.6	1.4	#.5	#.5	#.3
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1.1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND	ND
15	1.1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	3.0	3.1	2.2	#.2	ND	ND	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	#.1	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	1.7	1.7	1.3	ND	#.1	ND	#.1
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	#.2	#.2	#.2	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	#.4	#.4	#.4	ND	ND	ND	#.1
35	O-XYLENE	.5	#.3	#.3	#.2	ND	ND	ND	#.1
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-85 2ND QTR	MSMW-4-85 2ND QTR DUPLICATE	MSMW-4-85 2ND QTR DUPL(RPT)	MSMW-4-85 3RD QTR	MSMW-6-85 1ST QTR	MSMW-6-85 1ST QTR QC-REPEAT	MSMW-6-85 2ND QTR
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	#.1	#.1	#.1	ND	ND	ND	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	#.1	#.1	#.1	ND	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	99%	93%	95%	114%	109%	108%	92%
58	1,4-DICHLOROBUTANE	10 UG/L	90%	88%	92%	121%	107%	109%	94%
59	4-BROMOFLUOROBENZENE	2 UG/L	95%	93%	96%	97%	107%	109%	97%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-85 3RD QTR	MSMW-6-85 3RD QTR DUPLICATE	MSMW-6-85 3RD QTR DUPL(RPT)	MSMW-7-85 1ST QTR	MSMW-7-85 1ST QTR DUPLICATE	MSMW-7-85 2ND QTR	MSMW-7-85 2ND QTR QC-REPEAT
1	CHLOROMETHANE	5.0	ND	ND	ND	#.1	#.1	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	#1.5	#1.3	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND	#.2	#.1	ND	ND	#.5	#.5
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	#.5	#.4	#.5	#.6	#.1	#.4	1.0
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	ND	ND	#.1	ND	ND	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	#.1	ND	ND	#.4	#.4	#.4	#.4
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	ND	ND	ND	ND	ND	ND	#.1
35	O-XYLENE	.5	ND	ND	ND	ND	ND	ND	ND
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-85 3RD QTR	MSMW-6-85 3RD QTR DUPLICATE	MSMW-6-85 3RD QTR DUPL(RPT)	MSMW-7-85 1ST QTR	MSMW-7-85 1ST QTR DUPLICATE	MSMW-7-85 2ND QTR	MSMW-7-85 2ND QTR QC-REPEAT
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1.3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1.2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	94%	94%	88%	90%	95%	97%	95%
58	1,4-DICHLOROBUTANE	10 UG/L	117%	83%	103%	89%	90%	99%	98%
59	4-BROMOFLUOROBENZENE	2 UG/L	86%	74%	86%	83%	91%	92%	95%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-7-85 3RD QTR	MSMW-7-85 3RD QTR DUPLICATE	MSMW-1-86 1ST QTR	MSMW-1-86 2ND QTR	MSMW-1-86 2ND QTR QC-REPEAT	MSMW-1-86 3RD QTR	MSMW-3-86 1ST QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	*1.3	*.8	ND	*1.0	*1.1	*.9	ND
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	*.2	1.0	*.6	*.4	*.3	*.5	ND
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	ND	ND	ND	ND	ND	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	*.3	*.3	ND	*.1	ND	*.1	*.2
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	ND	ND	ND	*.2	*.2	ND	*.2
35	O-XYLENE	.5	ND	ND	ND	*.1	*.1	ND	ND
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED § = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-7-85 3RD QTR	MSMW-7-85 3RD QTR DUPLICATE	MSMW-1-86 1ST QTR	MSMW-1-86 2ND QTR	MSMW-1-86 2ND QTR QC-REPEAT	MSMW-1-86 3RD QTR	MSMW-3-86 1ST QTR
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	§.1
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	§.1
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	93%	97%	106%	99%	89%	116%	93%
58	1,4-DICHLOROBUTANE	10 UG/L	90%	97%	107%	90%	94%	97%	89%
59	4-BROMOFLUOROBENZENE	2 UG/L	91%	93%	107%	93%	94%	92%	92%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-86 1ST QTR	MSMW-4-86 2ND QTR	MSMW-4-86 3RD QTR	MSMW-5-86 1ST QTR	MSMW-5-86 2ND QTR	MSMW-5-86 3RD QTR	MSMW-6-86 1ST QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	*.7	*.5	*.5	*.4	*.8	*1.2	ND
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	*.9	*.3	1.6	*.1	*.6	6.1	*.2
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	*.2	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	ND	ND	ND	ND	*.1	*.2
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	*.1	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	ND	*.1	*.1	ND	ND	*.3	*.1
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	ND	*.2	ND	*.1	*.1	*.2	ND
35	O-XYLENE	.5	ND	*.1	ND	ND	ND	*.1	ND
36	STYRENE	.5	ND	ND	ND	ND	ND	*.1	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D)   ND = NOT DETECTED   # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. US/L	MSMW-4-86 1ST QTR	MSMW-4-86 2ND QTR	MSMW-4-86 3RD QTR	MSMW-5-86 1ST QTR	MSMW-5-86 2ND QTR	MSMW-5-86 3RD QTR	MSMW-6-36 1ST QTR
41 BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42 1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43 1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44 1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45 1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46 PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47 1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48 1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49 1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50 1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51 1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52 1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53 1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54 HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55 1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56 HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:	AMOUNT							
57 1-CHLORO-2-BROMOPROPANE	10 UG/L	119%	93%	100%	99%	97%	73%	114%
58 1,4-DICHLOROBUTANE	10 UG/L	127%	95%	93%	92%	95%	82%	122%
59 4-BROMOFLUOROBENZENE	2 UG/L	125%	95%	88%	91%	93%	55%	123%

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VOLATILE ORGANICS RESULTS

ND = NOT DETECTED

* = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-86 2ND QTR	MSMW-6-86 3RD QTR	MSMW-7-96 1ST QTR	MSMW-7-86 2ND QTR	MSMW-7-86 3RD QTR	MSMW-8-86 1ST QTR	MSMW-8-8 2ND QT
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	2.0	*1.4	ND	*1.4	ND	3.7	*.6
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	*.4	*.7	*.2	*.3	ND	ND	*.4
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	*.1	ND	ND	ND	*.1	*.1
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	ND	*.1	ND	ND	ND	*.1	ND
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	*.1	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	*.2	ND	ND	ND	ND	ND	*.1
35	O-XYLENE	.5	*.1	ND	ND	*.1	ND	ND	ND
36	STYRENE	.5	ND	ND	ND	ND	ND	*.1	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	MSMW-6-86 2ND QTR	MSMW-6-86 3RD QTR	MSMW-7-86 1ST QTR	MSMW-7-86 2ND QTR	MSMW-7-86 3RD QTR	MSMW-8-86 1ST QTR	MSMW-8-86 2ND QTR
41 BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42 1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43 1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44 1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45 1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46 PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47 1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48 1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49 1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50 1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51 1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52 1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53 1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54 HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55 1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56 HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:	AMOUNT							
57 1-CHLORO-2-BROMOPROPANE	10 UG/L	77%	89%	109%	94%	85%	95%	97%
58 1,4-DICHLOROBUTANE	10 UG/L	98%	78%	120%	102%	83%	88%	97%
59 4-BROMOFLUOROBENZENE	2 UG/L	98%	87%	121%	97%	88%	90%	102%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-86 3RD QTR	MSMW-1-87 1ST QTR	MSMW-1-87 2ND QTR	MSMW-1-87 3RD QTR	MSMW-2-87 1ST QTR	MSMW-2-87 2ND QTR	MSMW-2-87 3RD QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND	*.2	*.7	*.6	ND	*.5	*.7
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	*.7	*.6	*.8	*.3	*.6	*.4	*.9
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	*.2	*.2	*.3	*.3	*.2	ND	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	*.1	ND	*.1	*.1	ND	*.1	ND
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1.2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	ND	ND	*.2	ND	ND	*.2	ND
35	O-XYLENE	.5	ND	ND	*.1	ND	ND	*.1	ND
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-86 3RD QTR	MSMW-1-87 1ST QTR	MSMW-1-87 2ND QTR	MSMW-1-87 3RD QTR	MSMW-2-87 1ST QTR	MSMW-2-87 2ND QTR	MSMW-2-87 3RD QTR
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	87%	99%	102%	82%	101%	92%	96%
58	1,4-DICHLOROBUTANE	10 UG/L	118%	96%	95%	94%	104%	91%	96%
59	4-BROMOFLUOROBENZENE	2 UG/L	82%	89%	96%	95%	99%	97%	93%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-2-87 3RD QTR DUPLICATE	MSMW-3-87 1ST QTR	MSMW-3-87 2ND QTR	MSMW-3-87 3RD QTR	MSMW-4-87 1ST QTR	MSMW-4-87 1ST QTR QC-REPEAT	MSMW-4-87 2ND QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	‡.3	‡.9	‡.5	ND	47.6	56.6	‡1.1
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	1.2	1.4	1.1	‡.5	91.6	91.9	‡.3
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1.1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1.2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	79.8	89.7	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	‡.2	‡.2	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	‡.2	‡.3	ND	‡.2	‡.2	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	‡.1	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	ND	‡.1	‡.1	ND	‡.5	‡.5	‡.1
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	‡.3	‡.3	ND
34	M-XYLENE & P-XYLENE	.5	ND	ND	‡.1	ND	‡.2	‡.2	‡.2
35	O-XYLENE	.5	ND	ND	ND	ND	‡.1	‡.1	‡.1
36	STYRENE	.5	ND	ND	ND	ND	0.9	1.0	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-2-87 3RD QTR DUPLICATE	MSMW-3-87 1ST QTR	MSMW-3-87 2ND QTR	MSMW-3-87 3RD QTR	MSMW-4-87 1ST QTR	MSMW-4-87 1ST QTR QC-REPEAT	MSMW-4-87 2ND QTR
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	#.1	ND	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	86%	93%	103%	102%	104%	110%	91%
58	1,4-DICHLOROBUTANE	10 UG/L	96%	90%	98%	119%	100%	109%	92%
59	4-BROMOFLUOROBENZENE	2 UG/L	91%	88%	93%	95%	99%	107%	92%

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VOLATILE ORGANICS RESULTS

ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-87 3RD QTR	MSMW-5-87 1ST QTR	MSMW-5-87 1ST QTR QC-REPEAT	MSMW-5-87 2ND QTR	MSMW-5-87 3RD QTR	MSMW-6-87 1ST QTR	MSMW-6-87 2ND QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	‡.1	‡.5	‡.7	3.0	‡.2	‡.5	2.1
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	‡.1	‡.2	‡.2	‡.5	‡.9	6.2	‡.5
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	1.0	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	0.5
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	ND	ND	ND	ND	‡.2	‡.1
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	‡.1	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	‡.1	‡.1	‡.1	ND	ND	‡.1	‡.1
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	ND	ND	ND	‡.2	ND	ND	‡.2
35	O-XYLENE	.5	ND	ND	ND	‡.1	ND	ND	‡.1
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	MSMW-4-87 3RD QTR	MSMW-5-87 1ST QTR	MSMW-5-87 1ST QTR QC-REPEAT	MSMW-5-87 2ND QTR	MSMW-5-87 3RD QTR	MSMW-6-87 1ST QTR	MSMW-6-87 2ND QTR
41 BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42 1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43 1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44 1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45 1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46 PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47 1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48 1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49 1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50 1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51 1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52 1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53 1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54 HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55 1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56 HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:	AMOUNT							
57 1-CHLORO-2-BROMOPROPANE	10 UG/L	81%	98%	104%	92%	102%	99%	78%
58 1,4-DICHLOROBUTANE	10 UG/L	88%	107%	110%	97%	91%	96%	98%
59 4-BROMOFLUOROBENZENE	2 UG/L	89%	95%	109%	98%	90%	90%	96%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-87 2ND QTR DUPLICATE	MSMW-6-87 3RD QTR	MSMW-7-87 1ST QTR	MSMW-7-87 1ST QTR QC -REPEAT	MSMW-7-87 2ND QTR	MSMW-7-87 3RD QTR	MSMW-8-87 1ST QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	*1.3	*.1	4.5	5.3	*1.2	*.2	*1.4
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	*.2	*.6	*.9	1.8	*.6	1.8	4.5
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1.1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	*.2	ND	4.1
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	*.1	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	*.1	*.1	0.6	0.6	ND	0.5	*.2
18	1.2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	ND	*.1	1.0	1.0	ND	0.8	*.5
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	*.2	*.2	ND	*.1	ND
33	ETHYLBENZENE	.5	ND	ND	ND	*.1	ND	ND	*.1
34	M-XYLENE & P-XYLENE	.5	*.1	ND	*.3	*.3	*.3	*.2	*.2
35	O-XYLENE	.5	*.1	ND	*.2	*.2	*.2	*.1	ND
36	STYRENE	.5	ND	ND	*.1	*.1	ND	ND	*.4
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D)   ND = NOT DETECTED   # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	MSMW-6-87 2ND QTR DUPLICATE	MSMW-6-87 3RD QTR	MSMW-7-87 1ST QTR	MSMW-7-87 1ST QTR QC-REPEAT	MSMW-7-87 2ND QTR	MSMW-7-87 3RD QTR	MSMW-8-87 1ST QTR
41 BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42 1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	#.1	ND	ND	ND
43 1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44 1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45 1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46 PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47 1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48 1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49 1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50 1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51 1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52 1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53 1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54 HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55 1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56 HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:	AMOUNT							
57 1-CHLORO-2-BROMOPROPANE	10 UG/L	83%	99%	101%	99%	99%	98%	102%
58 1,4-DICHLOROBUTANE	10 UG/L	102%	94%	93%	94%	99%	115%	107%
59 4-BROMOFLUOROBENZENE	2 UG/L	102%	90%	94%	96%	94%	86%	99%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-87 2ND QTR	MSMW-8-87 3RD QTR	MSMW-8-87 3RD QTR QC-REPEAT	MSMW-9-87 1ST QTR	MSMW-9-87 2ND QTR	MSMW-9-87 3RD QTR	MSMW-10-87 1ST QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	‡1.3	‡.1	‡.1	‡.5	‡1.0	‡.6	ND
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	‡.3	‡.2	‡.2	‡.2	‡.3	2.3	‡.2
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	‡.1	ND	‡.3	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	‡.1	‡.1	‡.1	ND	ND	‡.1	0.6
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	‡.1
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	‡.2	‡.1	ND	ND	ND	‡.2	‡.1
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	‡.2	ND	ND	ND	‡.2	ND	ND
35	O-XYLENE	.5	‡.1	ND	ND	ND	‡.1	ND	‡.2
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-87 2ND QTR	MSMW-8-87 3RD QTR	MSMW-8-87 3RD QTR QC-REPEAT	MSMW-9-87 1ST QTR	MSMW-9-87 2ND QTR	MSMW-9-87 3RD QTR	MSMW-10-87 1ST QTR
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	84%	81%	105%	94%	96%	102%	117%
58	1,4-DICHLOROBUTANE	10 UG/L	102%	97%	103%	93%	94%	90%	124%
59	4-BROMOFLUOROBENZENE	2 UG/L	100%	92%	88%	89%	101%	91%	123%

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VOLATILE ORGANICS RESULTS

ND = NOT DETECTED

= COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-10-87 2ND QTR	MSMW-10-87 3RD QTR	MSMW-10-87 3RD QTR QC-REPEAT	MSMW-11-87 1ST QTR	MSMW-11-87 2ND QTR	MSMW-11-87 3RD QTR	MSMW-11-87 3RD QTR QC-REPEAT
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	3.3	#.2	#.1	#.6	#.1	#.3	#.1
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	1.4	#.2	#.2	#.1	#.3	1.9	1.3
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	#.1	#.1	#.1	ND	ND	ND	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	#.1	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	#.1	#.1	#.1	ND	ND	ND	ND
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	#.2	ND	ND	ND	#.2	ND	ND
35	O-XYLENE	.5	#.1	ND	ND	ND	#.1	ND	ND
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D)   ND = NOT DETECTED   # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-10-87 2ND QTR	MSMW-10-87 3RD QTR	MSMW-10-87 3RD QTR QC-REPEAT	MSMW-11-87 1ST QTR	MSMW-11-87 2ND QTR	MSMW-11-87 3RD QTR	MSMW-11-87 3RD QTR QC-REPEAT
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	84%	74%	125%	101%	79%	86%	105%
58	1,4-DICHLOROBUTANE	10 UG/L	102%	97%	126%	104%	98%	115%	117%
59	4-BROMOFLUOROBENZENE	2 UG/L	94%	93%	81%	90%	97%	76%	94%

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VOLATILE ORGANICS RESULTS

ND = NOT DETECTED $ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-12-87 1ST QTR	MSMW-12-87 2ND QTR	MSMW-12-87 3RD QTR	MSMW-13-87 1ST QTR	MSMW-13-87 2ND QTR	MSMW-13-87 3RD QTR	MSMW-14-87 1ST QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	6.7	7.5	3.9	$.2	$.4	$.1	$.5
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	70.0	1.3	6.2	1.8	$.2	6.4	ND
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	0.8	ND	$.2	0.6	ND	$.3	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	$.1	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	$.3	ND	$.1	$.1	ND	$.1	$.2
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	$.1	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	1.0	ND	1.1	ND	ND	$.1	$.1
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	$.2	ND	$.1	ND	ND	ND	ND
33	ETHYLBENZENE	.5	$.1	ND	$.1	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	$.4	$.4	$.3	ND	$.2	ND	ND
35	O-XYLENE	.5	$.2	$.2	$.1	ND	$.1	ND	ND
36	STYRENE	.5	$.1	ND	$.1	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D)

ND = NOT DETECTED

= COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-12-87 1ST QTR	MSMW-12-87 2ND QTR	MSMW-12-87 3RD QTR	MSMW-13-87 1ST QTR	MSMW-13-87 2ND QTR	MSMW-13-87 3RD QTR	MSMW-14-87 1ST QTR
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	#.1	ND	ND	ND	ND	ND	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	#.1	ND	#.1	ND	ND	ND	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	79%	106%	102%	102%	95%	89%	99%
58	1,4-DICHLOROBUTANE	10 UG/L	74%	102%	89%	107%	93%	83%	104%
59	4-BROMOFLUOROBENZENE	2 UG/L	66%	100%	91%	94%	100%	79%	102%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-14-87 2ND QTR	MSMW-14-87 3RD QTR	MSMW-15-87 1ST QTR	MSMW-15-87 2ND QTR	MSMW-15-87 4TH QTR	MSMW-15-87 4TH QTR QC-REPEAT	MSMW-15-97 4TH QTR DUPLICATE
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	‡1.7	‡1.6	‡.7	‡.9	‡.3	‡.3	2.9
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	‡.5	1.5	3.2	‡.4	1.5	1.7	21.5
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	‡.1	‡.3	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	ND	‡.2	ND	ND	ND	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	‡.1	ND	‡.3	‡.1	ND	ND	‡.1
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	‡.2	ND	‡.1	‡.1	ND	ND	ND
35	O-XYLENE	.5	‡.1	ND	ND	ND	ND	ND	ND
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-14-87 2ND QTR	MSMW-14-87 3RD QTR	MSMW-15-87 1ST QTR	MSMW-15-87 2ND QTR	MSMW-15-87 4TH QTR	MSMW-15-87 4TH QTR QC-REPEAT	MSMW-15-87 4TH QTR DUPLICATE
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	78%	81%	102%	95%	131%	137%	129%
58	1,4-DICHLOROBUTANE	10 UG/L	94%	89%	108%	95%	128%	133%	139%
59	4-BROMOFLUOROBENZENE	2 UG/L	95%	83%	100%	91%	124%	119%	112%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	87-39-01 1ST QTR QA/QC	87-39-01 1ST QTR QA/QC-RPT	P8-86 1ST QTR QA/QC	P10-87-BLF 1ST QTR QA/QC	CITYW 1ST QTR QA/QC	CITYW 1ST QTR QA/QC-RPT	DIW 1ST QTR QA/QC
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND	ND	*1.5	*.8	*.8	*.4	*.7
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	ND	*.1	62.5	*.2	*.1	*.2	12.2
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	8.8	9.5	7.1	*.1	11.6	11.1	*.2
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	*.3	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	ND	ND	ND	ND	ND	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	5.7	5.8	*.3	ND	7.7	6.9	*.1
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	*.2	*.2	1.9	*.2	ND	ND	0.6
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	*.2
30	DIBROMOCHLOROMETHANE	2.0	3.9	3.9	ND	ND	3.9	4.1	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	ND	ND	*.2	*.1	*.1	*.1	*.1
35	O-XYLENE	.5	ND	ND	ND	ND	ND	ND	ND
36	STYRENE	.5	ND	ND	*.2	*.1	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D)   ND = NOT DETECTED   # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	87-39-01 1ST QTR QA/QC	87-39-01 1ST QTR QA/QC-RPT	P8-86 1ST QTR QA/QC	P10-87-BLF 1ST QTR QA/QC	CITYW 1ST QTR QA/QC	CITYW 1ST QTR QA/QC-RPT	DIW 1ST QTR QA/QC
41 BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42 1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	#.1	ND	ND	ND	ND
43 1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44 1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45 1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46 PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47 1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48 1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49 1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50 1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51 1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52 1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53 1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54 HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55 1,2,4-TRICHLOROBENZENE	1.0	#.1	ND	#.1	ND	ND	ND	ND
56 HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:	AMOUNT							
57 1-CHLORO-2-BROMOPROPANE	10 UG/L	91%	93%	90%	105%	96%	93%	102%
58 1,4-DICHLOROBUTANE	10 UG/L	90%	91%	104%	105%	96%	93%	93%
59 4-BROMOFLUOROBENZENE	2 UG/L	86%	91%	106%	106%	98%	100%	90%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-16-87 3RD QTR QA/QC
1	CHLOROMETHANE	5.0	ND
2	VINYL CHLORIDE	5.0	ND
3	CHLOROETHANE	5.0	ND
4	TRICHLOROFLUOROMETHANE	2.0	#.2
5	BROMOMETHANE	2.0	ND
6	ACROLEIN	25.0	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND
8	1,1-DICHLOROETHENE	1.0	ND
9	DICHLOROMETHANE	1.0	1.7
10	ACRYLONITRILE	10.0	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND
12	1,1-DICHLOROETHANE	.5	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND
14	CHLOROFORM	.5	4.6
15	1,1,1-TRICHLOROETHANE	.5	ND
16	CARBON TETRACHLORIDE	.5	ND
17	BENZENE	.5	#.2
18	1,2-DICHLOROETHANE	1.0	ND
19	TRICHLOROETHENE	.5	ND
20	1,2-DICHLOROPROPANE	1.0	ND
21	BROMODICHLOROMETHANE	1.0	2.9
22	DIBROMOMETHANE	2.0	ND
23	DICHLOROACETONITRILE	15.0	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND
26	TOLUENE	.5	#.2
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND
29	TETRACHLOROETHENE	.5	ND
30	DIBROMOCHLOROMETHANE	2.0	#1.6
31	1,2-DIBROMOETHANE	2.0	ND
32	CHLOROBENZENE	.5	ND
33	ETHYLBENZENE	.5	ND
34	M-XYLENE & P-XYLENE	.5	ND
35	O-XYLENE	.5	ND
36	STYRENE	.5	ND
37	ISOPROPYLBENZENE	.2	ND
38	BROMOFORM	2.0	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND
40	PROPYLBENZENE	.2	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-16-87 3RD QTR QA/QC
41	BROMOBENZENE	1.0	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND
45	1,2,4-TRIMETHYLBENZENE	.2	‡.1
46	PENTACHLOROETHANE	1.0	ND
47	1,3-DICHLOROBENZENE	.5	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND
49	1,4-DICHLOROBENZENE	.5	ND
50	1,3-DIETHYLBENZENE	.2	ND
51	1,4-DIETHYLBENZENE	.2	ND
52	1,2-DIETHYLBENZENE	.2	ND
53	1,2-DICHLOROBENZENE	.5	ND
54	HEXACHLOROETHANE	1.0	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT	
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	91%
58	1,4-DICHLOROBUTANE	10 UG/L	94%
59	4-BROMOFLUOROBENZENE	2 UG/L	82%

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SPIKED VOLATILE SAMPLES - PERCENT RECOVERIES

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#1 2ND QTR	REAGENT BLANK#1 3RD QTR	REAGENT BLANK#2 3RD QTR	REAGENT BLANK#1 4TH QTR
1	CHLOROMETHANE	20.0	85	112	83	68	58
2	VINYL CHLORIDE	20.0	83	87	87	96	104
3	CHLOROETHANE	20.0	86	88	72	91	92
4	TRICHLOROFLUOROMETHANE	5.0	128	62	63	92	39
5	BROMOMETHANE	20.0	101	103	70	94	71
6	ACROLEIN	21.0	94	79	44	97	
7	1,1,2-TRICHLOROTRIFLUOROETHANE	5.0	115	117	75	95	89
8	1,1-DICHLOROETHENE	5.0	87	81	71	99	69
9	DICHLOROMETHANE	5.0	88		65	93	
10	ACRYLONITRILE	30.2	92	113	73	99	
11	TRANS-1,2-DICHLOROETHENE	5.0	79	51	75	96	109
12	1,1-DICHLOROETHANE	5.0	92	78	71	99	123
13	CIS-1,2-DICHLOROETHENE	5.0	77	60	81	96	130
14	CHLOROFORM	5.0	107	85	69	97	122
15	1,1,1-TRICHLOROETHANE	5.0	110	79	67	98	133
16	CARBON TETRACHLORIDE	5.0	106	67	64	98	135
17	BENZENE	5.0	107		78	102	122
18	1,2-DICHLOROETHANE	5.0	104	110	68	104	142
19	TRICHLOROETHENE	5.0	101	69	73	106	142
20	1,2-DICHLOROPROPANE	5.0	110	82	84	110	148
21	BROMODICHLOROMETHANE	5.0	105	68	68	108	146
22	DIBROMOMETHANE	6.1	101	79	88	106	160
23	DICHLOROACETONITRILE	27.4	127	103	66	113	
24	1-BROMO-2-CHLOROETHANE	5.9	108	96	83	103	165
25	CIS-1,3-DICHLOROPROPENE	6.2	106	116	66	98	272
26	TOLUENE	5.0	110	124	63	97	250
27	TRANS-1,3-DICHLOROPROPENE	3.8	112	101	71	88	100
28	1,1,2-TRICHLOROETHANE	5.0	111	98	97	135	160
29	TETRACHLOROETHENE	5.0	112	75	86	99	147
30	DIBROMOCHLOROMETHANE	5.0	111	97	82	101	107
31	1,2-DIBROMOETHANE	6.0	104	110	97	103	102
32	CHLOROBENZENE	5.0	109	85	85	98	105
33	ETHYLBENZENE	5.0	103	82	78	102	100
34	M-XYLENE & P-XYLENE	1.5	114	91	77	98	94
35	O-XYLENE	2.0	106	88	79	98	136
36	STYRENE	2.0	106	91	82	103	134
37	ISOPROPYLBENZENE	2.0	106	89	67	102	89
38	BROMOFORM	5.0	100	103	73	106	112
39	1,1,2,2-TETRACHLOROETHANE	5.0	101	98	93	102	123
40	PROPYLBENZENE	1.9	106	87	63	99	65

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SPIKED VOLATILE SAMPLES - PERCENT RECOVERIES (CONTINUED)

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#1 2ND QTR	REAGENT BLANK#1 3RD QTR	REAGENT BLANK#2 3RD QTR	REAGENT BLANK#1 4TH QTR
41	BROMOBENZENE	3.4	105	94	74	102	86
42	1-ETHYL-3&4-METHYLBENZENE	1.9	121	93	64	98	95
43	1,3,5-TRIMETHYLBENZENE	2.0	103	86	64	102	90
44	1-ETHYL-2-METHYLBENZENE	2.0	106	91	68	99	95
45	1,2,4-TRIMETHYLBENZENE	1.9	108	92	67	103	94
46	PENTACHLOROETHANE	2.9	111	99	70	108	85
47	1,3-DICHLOROBENZENE	2.5	110	100	65	105	83
48	1,2,3-TRIMETHYLBENZENE	2.0	105	96	68	107	95
49	1,4-DICHLOROBENZENE	2.9	109	99	68	106	118
50	1,3-DIETHYLBENZENE	2.0	111	94	61	106	95
51	1,4-DIETHYLBENZENE	1.9	111	96	61	105	94
52	1,2-DIETHYLBENZENE	1.9	110	96	60	105	93
53	1,2-DICHLOROBENZENE	3.0	108	97	70	109	95
54	HEXACHLOROETHANE	2.5	109	95	53	105	75
55	1,2,4-TRICHLOROBENZENE	3.0	120	102	54	110	100
56	HEXACHLORO-1,3-BUTADIENE	2.0	113	95	33	106	89
SURROGATE STANDARD RECOVERIES:		AMOUNT					
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	108	101	103	94	143
58	1,4-DICHLOROBUTANE	10 UG/L	107	106	113	102	138
59	4-BROMOFLUOROBENZENE	2 UG/L	101	104	88	114	153

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SPIKED VOLATILE SAMPLES - PERCENT RECOVERIES

	COMPOUND	MSMW-6-85 2ND QTR	MSMW-3-86 1ST QTR	MSMW-5-86 1ST QTR	MSMW-5-86 2ND QTR	MSMW-2-87 1ST QTR	MSMW-2-87 3RD QTR	MSMW-7-87 3RD QTR	MSMW-11-87 1ST QTR
1	CHLOROMETHANE	110	89	109	104	134	77	61	117
2	VINYL CHLORIDE	122	77	184	91	151	82	65	162
3	CHLOROETHANE	90	75	140	67	162	81	52	123
4	TRICHLOROFLUOROMETHANE	197	62	111	106	135	99	73	160
5	BROMOMETHANE	104	85	153	81	133	82	75	144
6	ACROLEIN	88	71	57	106	27	111		60
7	1,1,2-TRICHLOROTRIFLUOROETHANE	148	104	135	86	158	100	73	152
8	1,1-DICHLOROETHENE	155	81	106	86	136	101	89	114
9	DICHLOROMETHANE	100	54	70	100	106	96	62	111
10	ACRYLONITRILE	103	88	62	110	48	113		142
11	TRANS-1,2-DICHLOROETHENE	111	82	89	130	120	103	90	120
12	1,1-DICHLOROETHANE	121	86	94	115	103	110	98	111
13	CIS-1,2-DICHLOROETHENE	85	69	85	107	79	106	104	87
14	CHLOROFORM	105	88	105	107	110	111	105	116
15	1,1,1-TRICHLOROETHANE	110	83	106	106	119	108	95	122
16	CARBON TETRACHLORIDE	117	84	105	105	118	105	92	117
17	BENZENE	104	68	101	106	113	105	102	122
18	1,2-DICHLOROETHANE	98	83	103	107	93	120	124	124
19	TRICHLOROETHENE	113	88	104	99	112	110		122
20	1,2-DICHLOROPROPANE	105	84	98	108	112	111	115	122
21	BROMODICHLOROMETHANE	100	83	100	106	115	116	123	123
22	DIBROMOMETHANE	96	81	93	105	103	112	121	115
23	DICHLOROACETONITRILE	73	76	63	137	48	140		193
24	1-BROMO-2-CHLOROETHANE	99	86	93	110	114	113	119	124
25	CIS-1,3-DICHLOROPROPENE	101	88	99	115	136	106	113	152
26	TOLUENE	104	93	109	137	126	123	97	130
27	TRANS-1,3-DICHLOROPROPENE	95	87	95	117	78	131	108	83
28	1,1,2-TRICHLOROETHANE	93	94	111	111	116	132	123	126
29	TETRACHLOROETHENE	100	88	100	105	118	75	88	128
30	DIBROMOCHLOROMETHANE	144	89	104	104	113	100	101	130
31	1,2-DIBROMOETHANE	147	86	104	127	123	104	102	121
32	CHLOROBENZENE	107	91	112	102	99	101	99	113
33	ETHYLBENZENE	111	94	106	102	103	100	94	116
34	M-XYLENE & P-XYLENE	102	81	130	95	116	96	87	124
35	O-XYLENE	106	94	109	104	107	95	93	118
36	STYRENE	105	91	108	102	103	124	106	118
37	ISOPROPYLBENZENE	111	84	104	100	99	99	87	113
38	BROMOFORM	106	87	103	106	100	106	112	119
39	1,1,2,2-TETRACHLOROETHANE	104	91	106	112	104	111		116
40	PROPYLBENZENE	108	86	107	99	100	100	93	113

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SPIKED VOLATILE SAMPLES - PERCENT RECOVERIES (CONTINUED)

	COMPOUND	MSMW-6-85 2ND QTR	MSMW-3-86 1ST QTR	MSMW-5-86 1ST QTR	MSMW-5-86 2ND QTR	MSMW-2-87 1ST QTR	MSMW-2-87 3RD QTR	MSMW-7-87 3RD QTR	MSMW-11-87 1ST QTR
41	BROMOBENZENE	107	89	104	102	101	102	102	115
42	1-ETHYL-3&4-METHYLBENZENE	112	74	108	100	115	103	94	100
43	1,3,5-TRIMETHYLBENZENE	106	98	101	100	92	104	95	119
44	1-ETHYL-2-METHYLBENZENE	108	85	105	102	103	98	96	113
45	1,2,4-TRIMETHYLBENZENE	106	89	108	106	102	101	99	116
46	PENTACHLOROETHANE	109	89	105	122	105	107		115
47	1,3-DICHLOROBENZENE	107	88	106	103	99	104	101	119
48	1,2,3-TRIMETHYLBENZENE	108	86	107	104	102	107	106	115
49	1,4-DICHLOROBENZENE	110	85	104	101	95	110	108	117
50	1,3-DIETHYLBENZENE	111	83	102	100	101	101	93	115
51	1,4-DIETHYLBENZENE	109	81	110	103	91	99	89	108
52	1,2-DIETHYLBENZENE	113	84	107	102	104	102	97	115
53	1,2-DICHLOROBENZENE	104	84	105	104	100	106	110	116
54	HEXACHLOROETHANE	108	91	101	103	101	99	92	119
55	1,2,4-TRICHLOROBENZENE	109	82	104	103	95	113	114	112
56	HEXACHLORO-1,3-BUTADIENE	110	85	107	94	106	108	94	116
SURROGATE STANDARD RECOVERIES:									
57	1-CHLORO-2-BROMOPROPANE	98	102	97	101	115	120	102	109
58	1,4-DICHLOROBUTANE	97	97	96	106	116	111	118	112
59	4-BROMOFLUOROBENZENE	98	100	101	102	113	115	123	112

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SPIKED VOLATILE SAMPLES - PERCENT RECOVERIES

	COMPOUND	AMOUNT UG/L	87-39-01 1ST QTR
1	CHLOROMETHANE	20.0	81
2	VINYL CHLORIDE	20.0	96
3	CHLOROETHANE	20.0	124
4	TRICHLOROFLUOROMETHANE	5.0	165
5	BROMOMETHANE	20.0	119
6	ACROLEIN	21.0	98
7	1,1,2-TRICHLOROTRIFLUOROETHANE	5.0	161
8	1,1-DICHLOROETHENE	5.0	122
9	DICHLOROMETHANE	5.0	93
10	ACRYLONITRILE	30.2	87
11	TRANS-1,2-DICHLOROETHENE	5.0	91
12	1,1-DICHLOROETHANE	5.0	92
13	CIS-1,2-DICHLOROETHENE	5.0	70
14	CHLOROFORM	5.0	100
15	1,1,1-TRICHLOROETHANE	5.0	106
16	CARBON TETRACHLORIDE	5.0	106
17	BENZENE	5.0	117
18	1,2-DICHLOROETHANE	5.0	108
19	TRICHLOROETHENE	5.0	111
20	1,2-DICHLOROPROPANE	5.0	111
21	BROMODICHLOROMETHANE	5.0	104
22	DIBROMOMETHANE	6.1	108
23	DICHLOROACETONITRILE	27.4	116
24	1-BROMO-2-CHLOROETHANE	5.9	115
25	CIS-1,3-DICHLOROPROPENE	6.2	108
26	TOLUENE	5.0	118
27	TRANS-1,3-DICHLOROPROPENE	3.8	110
28	1,1,2-TRICHLOROETHANE	5.0	118
29	TETRACHLOROETHENE	5.0	120
30	DIBROMOCHLOROMETHANE	5.0	100
31	1,2-DIBROMOETHANE	6.0	103
32	CHLOROBENZENE	5.0	103
33	ETHYLBENZENE	5.0	101
34	M-XYLENE & P-XYLENE	1.5	114
35	O-XYLENE	2.0	108
36	STYRENE	2.0	105
37	ISOPROPYLBENZENE	2.0	105
38	BROMOFORM	5.0	105
39	1,1,2,2-TETRACHLOROETHANE	5.0	101
40	PROPYLBENZENE	1.9	105

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SPIKED VOLATILE SAMPLES - PERCENT RECOVERIES (CONTINUED)

	COMPOUND	AMOUNT UG/L	87-39-01 1ST QTR
41	BROMOBENZENE	3.4	102
42	1-ETHYL-3&4-METHYLBENZENE	1.9	117
43	1,3,5-TRIMETHYLBENZENE	2.0	106
44	1-ETHYL-2-METHYLBENZENE	2.0	101
45	1,2,4-TRIMETHYLBENZENE	1.9	107
46	PENTACHLOROETHANE	2.9	104
47	1,3-DICHLOROBENZENE	2.5	105
48	1,2,3-TRIMETHYLBENZENE	2.0	103
49	1,4-DICHLOROBENZENE	2.9	104
50	1,3-DIETHYLBENZENE	2.0	108
51	1,4-DIETHYLBENZENE	1.9	110
52	1,2-DIETHYLBENZENE	1.9	110
53	1,2-DICHLOROBENZENE	3.0	105
54	HEXACHLOROETHANE	2.5	108
55	1,2,4-TRICHLOROBENZENE	3.0	121
56	HEXACHLORO-1,3-BUTADIENE	2.0	110

	SURROGATE STANDARD RECOVERIES:	AMOUNT	
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	113
58	1,4-DICHLOROBUTANE	10 UG/L	114
59	4-BROMOFLUOROBENZENE	2 UG/L	116

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	FIELD BLANK#1 1ST QTR	FIELD BLANK#2 1ST QTR	FIELD BLANK#3 1ST QTR	FIELD BLANK#4 1ST QTR	FIELD BLANK#5 1ST QTR	FIELD BLANK#1 2ND QTR	FIELD BLANK#2 2ND QTR
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	37.6	14.9	27.3	26.6	ND	8.6	9.2
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	167.0	1.4	1.7	#.5	#.8	1.7	1.4
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	24.4	ND	#.2	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	#.1	ND	ND	ND	ND	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	#.1	#.1	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	ND	#.1	#.1	ND	ND	ND	ND
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	#.1	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	ND	ND	ND	ND	ND	#.2	#.1
35	O-XYLENE	.5	ND	ND	ND	ND	ND	#.1	ND
36	STYRENE	.5	ND	#.1	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D)   ND = NOT DETECTED   * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	FIELD BLANK#1 1ST QTR	FIELD BLANK#2 1ST QTR	FIELD BLANK#3 1ST QTR	FIELD BLANK#4 1ST QTR	FIELD BLANK#5 1ST QTR	FIELD BLANK#1 2ND QTR	FIELD BLANK#2 2ND QTR
41 BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42 1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
43 1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
44 1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
45 1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
46 PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47 1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48 1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
49 1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50 1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51 1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
52 1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53 1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54 HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55 1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56 HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:	AMOUNT							
57 1-CHLORO-2-BROMOPROPANE	10 UG/L	95%	102%	104%	98%	93%	92%	95%
58 1,4-DICHLOROBUTANE	10 US/L	91%	102%	105%	89%	84%	100%	94%
59 4-BROMOFLUOROBENZENE	2 UG/L	85%	101%	105%	93%	83%	99%	96%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	FIELD BLANK#1 3RD QTR	FIELD BLANK#2 3RD QTR	FIELD BLANK#1 4TH QTR
1	CHLOROMETHANE	5.0	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	8.0	4.5	9.2
5	BROMOMETHANE	2.0	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND
9	DICHLOROMETHANE	1.0	11.7	6.2	4.3
10	ACRYLONITRILE	10.0	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND
17	BENZENE	.5	ND	ND	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND
26	TOLUENE	.5	ND	ND	#.2
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND
33	ETHYLBENZENE	.5	ND	ND	ND
34	M-XYLENE & P-XYLENE	.5	ND	ND	ND
35	O-XYLENE	.5	ND	ND	ND
36	STYRENE	.5	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	FIELD BLANK#1 3RD QTR	FIELD BLANK#2 3RD QTR	FIELD BLANK#1 4TH QTR
41	BROMOBENZENE	1.0	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	ND	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	ND	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	ND	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND
56	HEXACHLORO-1.3-BUTADIENE	.5	ND	ND	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT			
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	98%	90%	128%
58	1,4-DICHLOROBUTANE	10 UG/L	84%	90%	143%
59	4-BROMOFLUOROBENZENE	2 UG/L	83%	82%	111%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED $ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	HOUSE BLK 1ST QTR
1	CHLOROMETHANE	5.0	ND
2	VINYL CHLORIDE	5.0	ND
3	CHLOROETHANE	5.0	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND
5	BROMOMETHANE	2.0	ND
6	ACROLEIN	25.0	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND
8	1,1-DICHLOROETHENE	1.0	ND
9	DICHLOROMETHANE	1.0	$.7
10	ACRYLONITRILE	10.0	ND
11	TRANS-1.2-DICHLOROETHENE	.5	ND
12	1.1-DICHLOROETHANE	.5	ND
13	CIS-1.2-DICHLOROETHENE	.5	ND
14	CHLOROFORM	.5	ND
15	1,1,1-TRICHLOROETHANE	.5	ND
16	CARBON TETRACHLORIDE	.5	ND
17	BENZENE	.5	ND
18	1,2-DICHLOROETHANE	1.0	ND
19	TRICHLOROETHENE	.5	ND
20	1,2-DICHLOROPROPANE	1.0	ND
21	BROMODICHLOROMETHANE	1.0	ND
22	DIBROMOMETHANE	2.0	ND
23	DICHLOROACETONITRILE	15.0	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND
26	TOLUENE	.5	ND
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND
29	TETRACHLOROETHENE	.5	ND
30	DIBROMOCHLOROMETHANE	2.0	ND
31	1,2-DIBROMOETHANE	2.0	ND
32	CHLOROBENZENE	.5	ND
33	ETHYLBENZENE	.5	ND
34	M-XYLENE & P-XYLENE	.5	ND
35	O-XYLENE	.5	ND
36	STYRENE	.5	ND
37	ISOPROPYLBENZENE	.2	ND
38	BROMOFORM	2.0	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND
40	PROPYLBENZENE	.2	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	HOUSE BLK 1ST QTR
41	BROMOBENZENE	1.0	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND
46	PENTACHLOROETHANE	1.0	ND
47	1,3-DICHLOROBENZENE	.5	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND
49	1,4-DICHLOROBENZENE	.5	ND
50	1,3-DIETHYLBENZENE	.2	ND
51	1,4-DIETHYLBENZENE	.2	ND
52	1,2-DIETHYLBENZENE	.2	ND
53	1,2-DICHLOROBENZENE	.5	ND
54	HEXACHLOROETHANE	1.0	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND

SURROGATE STANDARD RECOVERIES:		AMOUNT	
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	94%
58	1,4-DICHLOROBUTANE	10 UG/L	89%
59	4-BROMOFLUOROBENZENE	2 UG/L	89%

APPENDIX G4

Fresh Water Aquifer
Base Neutral Extractables

Analyses by:

Barringer-Magenta Ltd.
Rexdale, Ontario

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BASE-NEUTRAL EXTRACTABLES RESULTS   ND = NOT DETECTED   # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-1-85 1ST QTR	MSMW-1-85 1ST QTR DUPLICATE	MSMW-1-85 2ND QTR	MSMW-1-85 2ND QTR QC REPEAT	MSMW-1-85 3RD QTR	MSMW-3-85 2ND QTR	MSMW-3-85 2ND QTR QC REPEAT
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	#.3	#.4	ND	ND	0.8
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	15.4	25.0	ND	ND	ND	#.2	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	2.3	1.1	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	ND	ND	#.7	ND	ND	ND	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-1-85 1ST QTR	MSMW-1-85 1ST QTR DUPLICATE	MSMW-1-85 2ND QTR	MSMW-1-85 2ND QTR QC REPEAT	MSMW-1-85 3RD QTR	MSMW-3-85 2ND QTR	MSMW-3-95 2ND QTR QC REPEAT
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	*.9
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	76%	78%	54%	51%	59%	70%	105%
49	2-FLUOROBIPHENYL	50 UG.L	78%	82%	60%	55%	124%	56%	97%
50	4-TERPHENYL-D14	50 UG/L	127%	131%	124%	113%	89%	53%	90%

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BASE-NEUTRAL EXTRACTABLES RESULTS   ND = NOT DETECTED $ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-3-85 3RD QTR	MSMW-4-85 1ST QTR	MSMW-4-85 2ND QTR	MSMW-4-85 2ND QTR DUPLICATE	MSMW-4-85 3RD QTR	MSMW-4-85 3RD QTR QC-REPEAT	MSMW-6-85 1ST QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	0.8	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	26.7	ND	ND	ND	ND	2.6
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	1.1	ND	$1.0	ND	ND	ND	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-3-85 3RD QTR	MSMW-4-85 1ST QTR	MSMW-4-85 2ND QTR	MSMW-4-85 2ND QTR DUPLICATE	MSMW-4-85 3RD QTR	MSMW-4-85 3RD QTR QC-REPEAT	MSMW-6-85 1ST QTR
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	25 UG/L	25%	66%	102%	86%	43%	22%	64%
49	2-FLUOROBIPHENYL	25 UG/L	46%	75%	99%	80%	43%	33%	64%
50	4-TERPHENYL-D14	25 UG/L	43%	109%	101%	76%	120%	107%	90%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-85 2ND QTR	MSMW-6-85 3RD QTR	MSMW-6-85 3RD QTR DUPLICATE	MSMW-7-85 1ST QTR	MSMW-7-85 1ST QTR DUPLICATE	MSMW-7-85 2ND QTR	MSMW-7-85 3RD QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	ND	ND	20.5	22.9	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	#.6	52.3	ND	#.4	ND	ND	#.9

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-85 2ND QTR	MSMW-6-85 3RD QTR	MSMW-6-85 3RD QTR DUPLICATE	MSMW-7-85 1ST QTR	MSMW-7-85 1ST QTR DUPLICATE	MSMW-7-85 2ND QTR	MSMW-7-85 3RD QTR
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT							
48	NITROBENZENE-D5	50 UG/L	80%	69%	42%	55%	55%	61%	81%
49	2-FLUOROBIPHENYL	50 UG/L	78%	232%	52%	68%	64%	63%	73%
50	4-TERPHENYL-D14	50 UG/L	72%	114%	56%	109%	122%	99%	32%

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BASE-NEUTRAL EXTRACTABLES RESULTS

ND = NOT DETECTED

= COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-7-85 3RD QTR DUPLICATE	MSMW-1-86 1ST QTR	MSMW-1-86 2ND QTR	MSMW-1-86 3RD QTR	MSMW-3-86 1ST QTR	MSMW-4-86 1ST QTR	MSM1-4-86 1ST QTR QC-REPEAT
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	1.0	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	0.7	6.1	1.9	1.7	22.2	3.7	6.1
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	11.4	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	6.1	1.6	#.5	62.4	1.2	#.6	#.5

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-7-85 3RD QTR DUPLICATE	MSMW-1-86 1ST QTR	MSMW-1-86 2ND QTR	MSMW-1-86 3RD QTR	MSMW-3-86 1ST QTR	MSMW-4-86 1ST QTR	MSMW-4-86 1ST QTR QC-REPEAT
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	#.8	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	34%	56%	81%	42%	53%	75%	64%
49	2-FLUOROBIPHENYL	50 UG/L	29%	71%	80%	39%	58%	78%	62%
50	4-TERPHENYL-D14	50 UG/L	34%	145%	129%	42%	212%	148%	193%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-86 2ND QTR	MSMW-4-86 3RD QTR	MSMW-5-86 1ST QTR	MSMW-5-86 1ST QTR QC-REPEAT	MSMW-5-86 2ND QTR	MSMW-5-86 3RD QTR	MSMW-5-86 3RD QTR QC-REPEAT
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	*.4	ND	ND	ND	0.5	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	1.8	ND	14.4	36.5	ND	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	1.2	ND	2.6	*.5	*.9	*.7	1.8

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-86 2ND QTR	MSMW-4-86 3RD QTR	MSMW-5-86 1ST QTR	MSMW-5-86 1ST QTR QC-REPEAT	MSMW-5-86 2ND QTR	MSMW-5-86 3RD QTR	MSMW-5-86 3RD QTR QC-REPEAT
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	#.8	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT							
48	NITROBENZENE-D5	50 UG/L	66%	74%	76%	59%	81%	79%	110%
49	2-FLUOROBIPHENYL	50 UG/L	74%	52%	79%	71%	77%	79%	79%
50	4-TERPHENYL-D14	50 UG/L	103%	62%	113%	126%	74%	77%	77%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	MSMW-6-86 1ST QTR	MSMW-6-86 2ND QTR	MSMW-6-86 3RD QTR	MSMW-7-86 1ST QTR	MSMW-7-86 2ND QTR	MSMW-7-86 3RD QTR	MSMW-8-86 1ST QTR
1 BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2 1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3 1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4 1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5 BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6 HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7 N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8 NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9 ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10 BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11 1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12 NAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
13 HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14 2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15 1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16 HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17 2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18 ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19 DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20 2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21 ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22 2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23 FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24 4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25 DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26 N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27 AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28 4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29 HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30 PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31 ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32 DI-N-BUTYL PHTHALATE	.5	3.0	ND	ND	3.7	ND	ND	41.1
33 FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34 BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35 PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36 BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	6.1
37 BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38 CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39 3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40 BIS(2-ETHYLHEXYL)PHTHALATE	1.0	*.4	3.2	*.9	1.1	ND	ND	*.6

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	MSMW-6-86 1ST QTR	MSMW-6-86 2ND QTR	MSMW-6-86 3RD QTR	MSMW-7-86 1ST QTR	MSMW-7-86 2ND QTR	MSMW-7-86 3RD QTR	MSMW-8-86 1ST QTR
41 DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	ND
42 BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43 BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44 BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45 INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46 DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47 BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:	AMOUNT							
48 NITROBENZENE-D5	50 UG/L	50%	34%	68%	72%	115%	90%	56%
49 2-FLUOROBIPHENYL	50 UG/L	54%	35%	61%	75%	94%	81%	68%
50 4-TERPHENYL-D14	50 UG/L	172%	96%	39%	195%	129%	108%	187%

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BASE-NEUTRAL EXTRACTABLES RESULTS   ND = NOT DETECTED   # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-86 2ND QTR	MSMW-8-86 3RD QTR	MSMW-1-87 1ST QTR	MSMW-1-87 2ND QTR	MSMW-1-87 2ND QTR QC-REPEAT	MSMW-1-87 3RD QTR	MSMW-2-87 1ST QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	0.7	ND	ND	0.6	#.3	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	0.5	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	ND	38.5	1.6	1.9	0.7	3.7
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	ND	ND	#.4	#.6	1.8	359.0	#.7

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-86 2ND QTR	MSMW-8-96 3RD QTR	MSMW-1-87 1ST QTR	MSMW-1-87 2ND QTR	MSMW-1-87 2ND QTR QC-REPEAT	MSMW-1-87 3RD QTR	MSMW-2-87 1ST QTR
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	8.4	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	72%	54%	57%	46%	32%	64%	83%
49	2-FLUOROBIPHENYL	50 UG/L	70%	54%	68%	66%	47%	55%	85%
50	4-TERPHENYL-D14	50 UG/L	90%	73%	95%	77%	87%	50%	147%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-2-87 2ND QTR	MSMW-2-87 2ND QTR DUPLICATE	MSMW-2-87 3RD QTR	MSMW-2-87 3RD QTR DUPLICATE	MSMW-3-87 1ST QTR	MSMW-3-87 2ND QTR	MSMW-3-87 3RD QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	ND	0.5	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	2.6	ND	ND	ND	20.6	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	9.7	2.7	1.8	1.5	1.3	ND	1.7

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-2-87 2ND QTR	MSMW-2-87 2ND QTR DUPLICATE	MSMW-2-87 3RD QTR	MSMW-2-87 3RD QTR DUPLICATE	MSMW-3-87 1ST QTR	MSMW-3-87 2ND QTR	MSMW-3-87 3RD QTR
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	63%	72%	96%	110%	76%	77%	60%
49	2-FLUOROBIPHENYL	50 UG/L	67%	70%	67%	78%	84%	78%	75%
50	4-TERPHENYL-D14	50 UG/L	175%	68%	75%	65%	111%	69%	70%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-87 1ST QTR	MSMW-4-87 2ND QTR	MSMW-4-87 3RD QTR	MSMW-4-87 3RD QTR QC-REPEAT	MSMW-5-87 1ST QTR	MSMW-5-87 2ND QTR	MSMW-5-87 3RD QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	0.7	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	#.1	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	15.6	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	2.2	1.5	1.6	ND	42.6	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	1.0	1.4	370.0	1.3	ND	ND	1.3

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-87 1ST QTR	MSMW-4-87 2ND QTR	MSMW-4-87 3RD QTR	MSMW-4-87 3RD QTR QC-REPEAT	MSMW-5-87 1ST QTR	MSMW-5-87 2ND QTR	MSMW-5-87 3RD QTR
41	DI-N-OCTYL PHTHALATE	1.0	1.4	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	56%	13%	6%	87%	93%	57%	78%
49	2-FLUOROBIPHENYL	50 UG/L	73%	21%	6%	73%	96%	61%	89%
50	4-TERPHENYL-D14	50 UG/L	63%	70%	31%	69%	82%	101%	68%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-87 1ST QTR	MSMW-6-87 2ND QTR	MSMW-6-87 2ND QTR DUPLICATE	MSMW-6-87 3RD QTR	MSMW-7-87 1ST QTR	MSMW-7-87 2ND QTR	MSMW-7-87 3RD QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	0.8	ND	ND	ND	ND	0.6	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	*.1	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	*.1	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	1.4	ND	1.9	ND	3.1	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	*.6	ND	ND	ND	2.9	*.6	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-87 1ST QTR	MSMW-6-87 2ND QTR	MSMW-6-87 2ND QTR DUPLICATE	MSMW-6-87 3RD QTR	MSMW-7-87 1ST QTR	MSMW-7-87 2ND QTR	MSMW-7-87 3RD QTR
41	DI-N-OCTYL PHTHALATE	1.0	*.6	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT							
48	NITROBENZENE-D5	50 UG/L	57%	41%	64%	88%	55%	74%	105%
49	2-FLUOROBIPHENYL	50 UG/L	79%	43%	69%	73%	62%	76%	78%
50	4-TERPHENYL-D14	50 UG/L	56%	92%	116%	109%	79%	72%	92%

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BASE-NEUTRAL EXTRACTABLES RESULTS

ND = NOT DETECTED

= COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-87 1ST QTR	MSMW-8-87 2ND QTR	MSMW-8-87 2ND QTR QC-REPEAT	MSMW-8-87 3RD QTR	MSMW-9-87 1ST QTR	MSMW-9-87 1ST QTR DUPLICATE	MSMW-9-87 2ND QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	0.8	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	#.1	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	1.9	ND	ND	3.7	35.2	26.6	1.5
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	1.5	1.4	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	#.7	ND	ND	4.8	#.7	#.6	4.3

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-87 1ST QTR	MSMW-8-87 2ND QTR	MSMW-8-87 2ND QTR QC-REPEAT	MSMW-8-87 3RD QTR	MSMW-9-87 1ST QTR	MSMW-9-87 1ST QTR DUPLICATE	MSMW-9-87 2ND QTR
41	DI-N-OCTYL PHTHALATE	1.0	#.7	ND	ND	ND	ND	1.8	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	59%	62%	14%	101%	74%	92%	60%
49	2-FLUOROBIPHENYL	50 UG/L	80%	66%	21%	84%	95%	101%	63%
50	4-TERPHENYL-D14	50 UG/L	42%	114%	142%	40%	240%	72%	118%

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BASE-NEUTRAL EXTRACTABLES RESULTS

ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-9-87 3RD QTR	MSMW-10-87 1ST QTR	MSMW-10-87 2ND QTR	MSMW-10-87 3RD QTR	MSMW-11-87 1ST QTR	MSMW-11-87 2ND QTR	MSMW-11-87 3RD QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	0.8	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	3.0	ND	ND	19.7	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	6.8	8.8	ND	8.7	ND	ND	1.3

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-9-87 3RD QTR	MSMW-10-87 1ST QTR	MSMW-10-87 2ND QTR	MSMW-10-87 3RD QTR	MSMW-11-87 1ST QTR	MSMW-11-87 2ND QTR	MSMW-11-87 3RD QTR
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	66%	64%	52%	117%	85%	11%	75%
49	2-FLUOROBIPHENYL	50 UG/L	62%	69%	53%	102%	94%	15%	78%
50	4-TERPHENYL-D14	50 UG/L	131%	176%	129%	28%	68%	49%	79%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-12-87 1ST QTR LOST SAMP	MSMW-12-87 2ND QTR	MSMW-12-87 3RD QTR	MSMW-12-87 3RD QTR QC-REPEAT	MSMW-13-87 1ST QTR	MSMW-13-87 1ST QTR QC-REPEAT	MSMW-13-87 2ND QTR
1	BIS(2-CHLOROETHYL)ETHER	.5		ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5		ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5		ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5		ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0		ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0		ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0		ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5		ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5		0.5	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5		ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0		ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5		0.5	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0		ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5		ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5		ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0		ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5		ND	ND	ND	ND	ND	0.7
18	ACENAPHTHYLENE	.5		ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5		ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0		ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5		ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0		ND	ND	ND	ND	ND	ND
23	FLUORENE	.5		ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0		ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5		ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5		ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5		ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0		ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0		ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5		ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5		ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5		ND	ND	ND	34.8	22.2	ND
33	FLUORANTHENE	.5		ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0		ND	ND	ND	ND	ND	ND
35	PYRENE	.5		ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0		ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0		ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0		ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0		ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0		ND	*.9	1.3	*.6	*1.6	*.6

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	MSMW-12-87 1ST QTR LOST SAMP	MSMW-12-87 2ND QTR	MSMW-12-87 3RD QTR	MSMW-12-87 3RD QTR QC-REPEAT	MSMW-13-87 1ST QTR	MSMW-13-87 1ST QTR QC-REPEAT	MSMW-13-87 2ND QTR
41 DI-N-OCTYL PHTHALATE	1.0		ND	ND	ND	ND	4.2	ND
42 BENZO(B)FLUORANTHENE	1.0		ND	ND	ND	ND	ND	ND
43 BENZO(K)FLUORANTHENE	1.0		ND	ND	ND	ND	ND	ND
44 BENZO(A)PYRENE	2.0		ND	ND	ND	ND	ND	ND
45 INDENO(1,2,3-CD)PYRENE	2.0		ND	ND	ND	ND	ND	ND
46 DIBENZO(A,H)ANTHRACENE	2.0		ND	ND	ND	ND	ND	ND
47 BENZO(GHI)PERYLENE	2.0		ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:	AMOUNT							
48 NITROBENZENE-D5	50 UG/L		48%	61%	92%	79%	57%	86%
49 2-FLUOROBIPHENYL	50 UG/L		56%	64%	70%	84%	65%	82%
50 4-TERPHENYL-D14	50 UG/L		94%	123%	101%	99%	69%	110%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-13-87 3RD QTR	MSMW-14-87 1ST QTR	MSMW-14-87 2ND QTR	MSMW-14-87 3RD QTR	MSMW-15-87 1ST QTR	MSMW-15-87 2ND QTR	MSMW-15-87 4TH QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	48.9	ND	ND	1.8	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	126.0	81.2	ND	7.9	ND	ND	8.9

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-13-87 3RD QTR	MSMW-14-87 1ST QTR	MSMW-14-87 2ND QTR	MSMW-14-87 3RD QTR	MSMW-15-87 1ST QTR	MSMW-15-87 2ND QTR	MSMW-15-87 4TH QTR
41	DI-N-OCTYL PHTHALATE	1.0	ND	*.7	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT							
48	NITROBENZENE-D5	50 UG/L	74%	121%	44%	92%	64%	73%	63%
49	2-FLUOROBIPHENYL	50 UG/L	65%	120%	50%	72%	65%	63%	70%
50	4-TERPHENYL-D14	50 UG/L	102%	136%	122%	101%	158%	97%	70%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-15-87 4TH QTR QC-REPEAT	MSMW-15-87 4TH QTR DUPLICATE
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND
8	NITROBENZENE	.5	ND	ND
9	ISOPHORONE	.5	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND
12	NAPHTHALENE	.5	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND
21	ACENAPHTHENE	.5	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND
23	FLUORENE	.5	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND
27	AZOBENZENE	.5	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND
30	PHENANTHRENE	.5	ND	ND
31	ANTHRACENE	.5	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	ND
33	FLUORANTHENE	.5	ND	ND
34	BENZIDINE	15.0	ND	ND
35	PYRENE	.5	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND
38	CHRYSENE	1.0	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	ND	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-15-87 4TH QTR QC-REPEAT	MSMW-15-87 4TH QTR DUPLICATE
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT		
48	NITROBENZENE-D5	50 UG/L	79%	65%
49	2-FLUOROBIPHENYL	50 UG/L	76%	75%
50	4-TERPHENYL-D14	50 UG/L	110%	113%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	87-39-01 1ST QTR QA/QC	87-39-01 1ST QTR QA/QC-RPT	P8-86 1ST QTR QA/QC	P10-87-BLF 1ST QTR QA/QC	CITYW 1ST QTR QA/QC	CITYW 1ST QTR QA/QC-RPT	DIW 1ST QTR QA/QC
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	41.3	45.3	2.2	12.5	8.6	19.2	1.2
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	4.3	6.5	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	6.6	4.2	2.5	‡.4	ND	1.1	‡.4

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	87-39-01 1ST QTR QA/QC	87-39-01 1ST QTR QA/QC-RPT	PB-86 1ST QTR QA/QC	P10-87-BLF 1ST QTR QA/QC	CITYW 1ST QTR QA/QC	CITYW 1ST QTR QA/QC-RPT	DIW 1ST QTR QA/QC
41	DI-N-OCTYL PHTHALATE	1.0	7.3	18.1	#.9	ND	ND	12.3	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	67%	69%	35%	84%	86%	56%	67%
49	2-FLUOROBIPHENYL	50 UG/L	63%	67%	64%	92%	88%	62%	68%
50	4-TERPHENYL-D14	50 UG/L	69%	65%	75%	91%	119%	86%	74%

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR	REAGENT BLANK#4 1ST QTR	REAGENT BLANK#5 1ST QTR	REAGENT BLANK#6 1ST QTR	REAGENT BLANK#7 1ST QTR
1	BIS(2-CHLOROETHYL)ETHER	50.0	60	48	82	75	64	89	96
2	1,3-DICHLOROBENZENE	50.0	39	53	73	66	60	82	91
3	1,4-DICHLOROBENZENE	50.0	42	53	73	68	60	82	91
4	1,2-DICHLOROBENZENE	50.0	45	53	76	71	62	85	93
5	BIS(2-CHLOROISOPROPYL)ETHER	50.0	65	54	84	79	63	91	87
6	HEXACHLOROETHANE	50.0	32	48	58	61	61	84	91
7	N-NITROSODI-N-PROPYLAMINE	50.0	61	55	91	88	62	91	90
8	NITROBENZENE	50.0	67	50	81	81	67	91	101
9	ISOPHORONE	50.0	70	73	121	85	74	106	108
10	BIS(2-CHLOROETHOXY)METHANE	50.0	59	25	71	76	65	90	99
11	1,2,4-TRICHLOROBENZENE	50.0	44	62	80	76	64	90	97
12	NAPHTHALENE	50.0	60	54	81	81	66	90	99
13	HEXACHLOROBUTADIENE	50.0	33	52	57	66	62	86	89
14	2-METHYLNAPHTHALENE	50.0	51	54	72	82	72	89	97
15	1-METHYLNAPHTHALENE	50.0				86	75	90	99
16	HEXACHLOROCYCLOPENTADIENE	50.0	34	40	49	49	47	55	65
17	2-CHLORONAPHTHALENE	50.0	60	68	98	84	81	88	94
18	ACENAPHTHYLENE	50.0	63	61	100	81	83	89	97
19	DIMETHYL PHTHALATE	50.0	14	11	8	54	91	91	96
20	2,6-DINITROTOLUENE	50.0	80	75	121	82	94	103	75
21	ACENAPHTHENE	50.0	64	63	94	82	83	91	93
22	2,4-DINITROTOLUENE	50.0	66	64	109	67	96	97	110
23	FLUORENE	50.0	66	66	102	82	93	91	97
24	4-CHLOROPHENYL PHENYL ETHER	50.0	65	68	90	80	94	92	91
25	DIETHYL PHTHALATE	50.0	43	34	12	72	103	95	102
26	N-NITROSODIPHENYLAMINE	50.0	60	70	107	66	80	93	100
27	AZOBENZENE	50.0	70	65	95	79	99	97	99
28	4-BROMOPHENYL PHENYL ETHER	50.0	64	59	90	72	93	89	110
29	HEXACHLOROBENZENE	50.0	64	80	104	79	98	95	119
30	PHENANTHRENE	50.0	69	72	111	77	102	95	92
31	ANTHRACENE	50.0	74	68	100	74	99	85	86
32	DI-N-BUTYL PHTHALATE	50.0	18	71	45	78	230	104	218
33	FLUORANTHENE	50.0	75	81	119	90	102	101	80
34	BENZIDINE	50.0	<1	2	3				
35	PYRENE	50.0	72	77	115	102	95	100	72
36	BENZYL BUTYL PHTHALATE	50.0	58	50	51	92	168	96	112
37	BENZO(A)ANTHRACENE	50.0	67	128	185	96	100	102	92
38	CHRYSENE	50.0	73	92	127	83	103	108	86
39	3,3'-DICHLOROBENZIDINE	50.0	50	242	270				
40	BIS(2-ETHYLHEXYL)PHTHALATE	50.0	72	89	151	118	145	96	135

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES (CONTINUED)

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR	REAGENT BLANK#4 1ST QTR	REAGENT BLANK#5 1ST QTR	REAGENT BLANK#6 1ST QTR	REAGENT BLANK#7 1ST QTR
41	DI-N-OCTYL PHTHALATE	50.0	79	91	124	130	89	103	77
42	BENZO(B)FLUORANTHENE	50.0	71	108	164	96	62	101	76
43	BENZO(K)FLUORANTHENE	50.0	76	94	129	76	71	102	82
44	BENZO(A)PYRENE	50.0	65	102	157	90	60	108	67
45	INDENO(1,2,3-CD)PYRENE	50.0	64	114	162	98	58	122	61
46	DIBENZO(A,H)ANTHRACENE	50.0	68	116	169	79	57	115	61
47	BENZO(GHI)PERYLENE	50.0	69	110	159	73	54	107	62

	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	58	41	60	73	61	88	94
49	2-FLUOROBIPHENYL	50 UG/L	58	58	78	78	72	88	92
50	4-TERPHENYL-D14	50 UG/L	63	62	76	106	85	96	88

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES

	COMPOUND	AMOUNT UG/L	MSMW-1-85 1ST QTR DUPLICATE	MSMW-4-85 1ST QTR	MSMW-10-87 1ST QTR	MSMW-11-87 1ST QTR	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR
1	BIS(2-CHLOROETHYL)ETHER	50.0	100	60	82	107	67	79	82
2	1,3-DICHLOROBENZENE	50.0	96	54	81	106	55	65	68
3	1,4-DICHLOROBENZENE	50.0	96	55	83	107	56	67	70
4	1,2-DICHLOROBENZENE	50.0	100	57	84	108	58	69	73
5	BIS(2-CHLOROISOPROPYL)ETHER	50.0	100	60	86	100	61	74	77
6	HEXACHLOROETHANE	50.0	98	53	85	103	59	61	69
7	N-NITROSODI-N-PROPYLAMINE	50.0	95	57	93	91	59	79	71
8	NITROBENZENE	50.0	103	62	88	106	72	80	83
9	ISOPHORONE	50.0	107	71	97	112	82	86	90
10	BIS(2-CHLOROETHOXY)METHANE	50.0	94	62	85	104	74	77	84
11	1,2,4-TRICHLOROBENZENE	50.0	96	59	90	104	59	65	67
12	NAPHTHALENE	50.0	98	61	92	104	64	75	80
13	HEXACHLOROBUTADIENE	50.0	96	56	91	102	66	54	60
14	2-METHYLNAPHTHALENE	50.0	96	66	100	122	67	75	77
15	1-METHYLNAPHTHALENE	50.0	98	69	96	109	67	78	83
16	HEXACHLOROCYCLOPENTADIENE	50.0	74	47	58	60	56	38	43
17	2-CHLORONAPHTHALENE	50.0	97	74	96	118	73	78	82
18	ACENAPHTHYLENE	50.0	96	76	92	120	77	80	86
19	DIMETHYL PHTHALATE	50.0	87	70	92	122	91	73	72
20	2,6-DINITROTOLUENE	50.0	85	88	97	120	92	77	85
21	ACENAPHTHENE	50.0	93	78	98	121	74	77	84
22	2,4-DINITROTOLUENE	50.0	74	100	78	99	98	75	88
23	FLUORENE	50.0	91	88	102	127	83	78	82
24	4-CHLOROPHENYL PHENYL ETHER	50.0	92	89	102	138	91	75	80
25	DIETHYL PHTHALATE	50.0	91	89	97	133	91	78	83
26	N-NITROSODIPHENYLAMINE	50.0	64	65	50	72	84	67	85
27	AZOBENZENE	50.0	92	93	91	126	101	82	94
28	4-BROMOPHENYL PHENYL ETHER	50.0	85	85	85	119	94	78	88
29	HEXACHLOROBENZENE	50.0	90	97	96	118	102	77	85
30	PHENANTHRENE	50.0	98	103	88	105	97	85	91
31	ANTHRACENE	50.0	85	95	83	96	92	80	83
32	DI-N-BUTYL PHTHALATE	50.0	96	97	75	129	85	86	87
33	FLUORANTHENE	50.0	71	113	72	92	59	94	75
34	BENZIDINE	50.0							
35	PYRENE	50.0	70	106	79	92	50	7	79
36	BENZYL BUTYL PHTHALATE	50.0	160	131	89	120	99	74	99
37	BENZO(A)ANTHRACENE	50.0	109	103	95	94	96	90	102
38	CHRYSENE	50.0	109	95	95	96	95	83	109
39	3,3'-DICHLOROBENZIDINE	50.0							
40	BIS(2-ETHYLHEXYL)PHTHALATE	50.0	134	129	111	99		67	105

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES (CONTINUED)

	COMPOUND	AMOUNT UG/L	MSMW-1-85 1ST QTR DUPLICATE	MSMW-4-85 1ST QTR	MSMW-10-87 1ST QTR	MSMW-11-87 1ST QTR	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR
41	DI-N-OCTYL PHTHALATE	50.0	105	92	99	63	69	93	104
42	BENZO(B)FLUORANTHENE	50.0	81	64	82	61	51	117	122
43	BENZO(K)FLUORANTHENE	50.0	99	75	70	76	48	97	98
44	BENZO(A)PYRENE	50.0	86	67	74	58	49	123	120
45	INDENO(1,2,3-CD)PYRENE	50.0	77	65	81	63	52	146	145
46	DIBENZO(A,H)ANTHRACENE	50.0	81	63	68	72	53	138	140
47	BENZO(GHI)PERYLENE	50.0	69	56	68	79	52	109	152
SURROGATE STANDARD RECOVERIES:		AMOUNT							
48	NITROBENZENE-D5	50 UG/L	93	57	83	80	63	74	80
49	2-FLUOROBIPHENYL	50 UG/L	89	66	94	88	65	75	82
50	4-TERPHENYL-D14	50 UG/L	59	104	84	78	55	119	84

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BASE-NEUTRAL EXTRACTABLES RESULTS   ND = NOT DETECTED   * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-16-87 2ND QTR QA/QC	MSMW-16-87 3RD QTR QA/QC	MSMW-16-87 3RD QTR DUPLICATE	MSMW-16-87 3RD QTR DUPL(RPT)
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	2.4	ND	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	8.9	1.3	ND	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-16-87 2ND QTR QA/QC	MSMW-16-87 3RD QTR QA/QC	MSMW-16-87 3RD QTR DUPLICATE	MSMW-16-87 3RD QTR DUPL(RPT)
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT				
48	NITROBENZENE-D5	50 UG/L	34%	44%	69%	137%
49	2-FLUOROBIPHENYL	50 UG/L	48%	46%	76%	179%
50	4-TERPHENYL-D14	50 UG/L	89%	124%	109%	131%

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#4 2ND QTR	REAGENT BLANK#5 2ND QTR	MSMW-4-85 2ND QTR	MSMW-7-85 2ND QTR	MSMW-5-87 2ND QTR	MSMW-16-87 2ND QTR	REAGENT BLANK#1 3RD QTR
1	BIS(2-CHLOROETHYL)ETHER	50.0	80	57	87	56	61	80	43
2	1,3-DICHLOROBENZENE	50.0	69	47	75	48	47	65	42
3	1,4-DICHLOROBENZENE	50.0	70	50	75	49	49	67	41
4	1,2-DICHLOROBENZENE	50.0	70	52	79	48	53	68	44
5	BIS(2-CHLOROISOPROPYL)ETHER	50.0	77	60	84	51	62	72	46
6	HEXACHLOROETHANE	50.0	67	46	72	47	48	67	46
7	N-NITROSODI-N-PROPYLAMINE	50.0	76	51	82	49	73	67	41
8	NITROBENZENE	50.0	81	65	91	55	69	81	52
9	ISOPHORONE	50.0	93	74	97	61	97	89	59
10	BIS(2-CHLOROETHOXY)METHANE	50.0	82	66	87	52	75	80	40
11	1,2,4-TRICHLOROBENZENE	50.0	69	57	72	47	63	69	43
12	NAPHTHALENE	50.0	79	64	81	51	64	71	37
13	HEXACHLOROBUTADIENE	50.0	59	48	62	46	64	67	40
14	2-METHYLNAPHTHALENE	50.0	73	65	75	53	72	80	41
15	1-METHYLNAPHTHALENE	50.0	85	71	88	57	74	81	48
16	HEXACHLOROCYCLOPENTADIENE	50.0	44	41	42	33	63	48	46
17	2-CHLORONAPHTHALENE	50.0	79	70	83	57	77	79	50
18	ACENAPHTHYLENE	50.0	83	75	86	61	90	87	46
19	DIMETHYL PHTHALATE	50.0	61	53	87	57	97	63	44
20	2,6-DINITROTOLUENE	50.0	91	82	91	67	108	89	62
21	ACENAPHTHENE	50.0	85	77	87	62	96	83	43
22	2,4-DINITROTOLUENE	50.0	93	80	98	76	117	88	58
23	FLUORENE	50.0	85	80	90	68	97	88	47
24	4-CHLOROPHENYL PHENYL ETHER	50.0	85	81	87	66	104	90	46
25	DIETHYL PHTHALATE	50.0	82	72	92	67	104	82	46
26	N-NITROSODIPHENYLAMINE	50.0	88	73	84	61	91	71	47
27	AZOBENZENE	50.0	92	83	106	73	99	91	58
28	4-BROMOPHENYL PHENYL ETHER	50.0	85	79	102	72	97	92	41
29	HEXACHLOROBENZENE	50.0	88	84	105	84	127	81	52
30	PHENANTHRENE	50.0	74	87	79	85	113	91	49
31	ANTHRACENE	50.0	69	86	82	82	107	89	40
32	DI-N-BUTYL PHTHALATE	50.0	82	82	93	81	129	82	44
33	FLUORANTHENE	50.0	89	88	94	57	141	67	40
34	BENZIDINE	50.0							
35	PYRENE	50.0	91	90	98	52	141	60	41
36	BENZYL BUTYL PHTHALATE	50.0	64	98	86	97	188	156	59
37	BENZO(A)ANTHRACENE	50.0	85	98	89	111	138	99	37
38	CHRYSENE	50.0	86	106	98	113	114	103	51
39	3,3'-DICHLOROBENZIDINE	50.0							17
40	BIS(2-ETHYLHEXYL)PHTHALATE	50.0	77	111	83	92	177	123	

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES (CONTINUED)

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#4 2ND QTR	REAGENT BLANK#5 2ND QTR	MSMW-4-85 2ND QTR	MSMW-7-85 2ND QTR	MSMW-5-87 2ND QTR	MSMW-16-87 2ND QTR	REAGENT BLANK#1 3RD QTR
41	DI-N-OCTYL PHTHALATE	50.0	75	115	128	86	180	79	63
42	BENZO(B)FLUORANTHENE	50.0	98	101	103	108	98	71	68
43	BENZO(K)FLUORANTHENE	50.0	83	97	111	103	77	85	75
44	BENZO(A)PYRENE	50.0	90	101	105	104	92	71	58
45	INDENO(1,2,3-CD)PYRENE	50.0	75	86	78	95	116	53	57
46	DIBENZO(A,H)ANTHRACENE	50.0	76	96	76	102	113	74	51
47	BENZO(GHI)PERYLENE	50.0	82	89	73	100	102	73	55
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	76	110	85	53	39	78	61
49	2-FLUOROBIPHENYL	50 UG/L	83	81	82	56	49	79	60
50	4-TERPHENYL-D14	50 UG/L	111	61	111	49	110	57	22

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#2 3RD QTR	MSMW-3-85 3RD QTR	MSMW-1-86 3RD QTR	MSMW-9-87 3RD QTR	REAGENT BLANK#1 4TH QTR
1	BIS(2-CHLOROETHYL)ETHER	50.0	42	68	68	95	51
2	1,3-DICHLOROBENZENE	50.0	46	64	68	75	44
3	1,4-DICHLOROBENZENE	50.0	48	68	69	77	48
4	1,2-DICHLOROBENZENE	50.0	48	70	72	78	52
5	BIS(2-CHLOROISOPROPYL)ETHER	50.0	43	65	66	81	50
6	HEXACHLOROETHANE	50.0	39	71	59	93	43
7	N-NITROSODI-N-PROPYLAMINE	50.0	46	61	62	184	42
8	NITROBENZENE	50.0	46	80	61	108	63
9	ISOPHORONE	50.0	49	88	75	112	74
10	BIS(2-CHLOROETHOXY)METHANE	50.0	49	65	51	78	57
11	1.2.4-TRICHLOROBENZENE	50.0	43	68	59	70	57
12	NAPHTHALENE	50.0	25	66	51	69	56
13	HEXACHLOROBUTADIENE	50.0	35	66	51	66	47
14	2-METHYLNAPHTHALENE	50.0	44	76	55	68	36
15	1-METHYLNAPHTHALENE	50.0	47	78	69	79	40
16	HEXACHLOROCYCLOPENTADIENE	50.0	23	49	32	32	37
17	2-CHLORONAPHTHALENE	50.0	47	80	67	78	72
18	ACENAPHTHYLENE	50.0	44	72	54	67	70
19	DIMETHYL PHTHALATE	50.0	35	69	51	60	31
20	2.6-DINITROTOLUENE	50.0	58	100	58	82	92
21	ACENAPHTHENE	50.0	47	72	54	64	72
22	2.4-DINITROTOLUENE	50.0	68	109	68	84	90
23	FLUORENE	50.0	50	77	59	68	80
24	4-CHLOROPHENYL PHENYL ETHER	50.0	54	73	55	66	76
25	DIETHYL PHTHALATE	50.0	41	77	60	63	43
26	N-NITROSODIPHENYLAMINE	50.0	58	80	60	56	89
27	AZOBENZENE	50.0	49	103	71	86	89
28	4-BROMOPHENYL PHENYL ETHER	50.0	42	86	58	67	78
29	HEXACHLOROBENZENE	50.0	79	91	69	76	82
30	PHENANTHRENE	50.0	65	84	69	68	78
31	ANTHRACENE	50.0	63	75	67	63	81
32	DI-N-BUTYL PHTHALATE	50.0	54	69	57	73	71
33	FLUORANTHENE	50.0	83	82	62	62	70
34	BENZIDINE	50.0					
35	PYRENE	50.0	89	78	57	76	71
36	BENZYL BUTYL PHTHALATE	50.0	64	99	67	95	129
37	BENZO(A)ANTHRACENE	50.0	80	91	87	82	94
38	CHRYSENE	50.0	80	85	88	79	99
39	3,3'-DICHLOROBENZIDINE	50.0	47.	32	44	29	47
40	BIS(2-ETHYLHEXYL)PHTHALATE	50.0	73	115	62	81	134

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES (CONTINUED)

	COMPOUND	AMOUNT US/L	REAGENT BLANK#2 3RD QTR	MSMW-3-85 3RD QTR	MSMW-1-86 3RD QTR	MSMW-9-87 3RD QTR	REAGENT BLANK#1 4TH QTR
41	DI-N-OCTYL PHTHALATE	50.0	72	107	47	77	91
42	BENZO(B)FLUORANTHENE	50.0	80	105	82	77	51
43	BENZO(K)FLUORANTHENE	50.0	70	84	89	67	59
44	BENZO(A)PYRENE	50.0	78	102	88	71	53
45	INDENO(1,2,3-CD)PYRENE	50.0	90	136	65	70	50
46	DIBENZO(A,H)ANTHRACENE	50.0	77	108	75	67	58
47	BENZO(GHI)PERYLENE	50.0	88	114	98	74	57
SURROGATE STANDARD RECOVERIES:		AMOUNT					
48	NITROBENZENE-D5	50 US/L	44	79	78	97	56
49	2-FLUOROBIPHENYL	50 US/L	49	76	84	70	73
50	4-TERPHENYL-D14	50 US/L	103	85	27	81	59

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BASE-NEUTRAL EXTRACTABLES RESULTS   ND = NOT DETECTED   * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	FIELD BLANK#1 1ST QTR	FIELD BLANK#2 1ST QTR	FIELD BLANK#3 1ST QTR	FIELD BLANK#1 2ND QTR	FIELD BLANK#1 3RD QTR	FIELD BLANK#2 3RD QTR	FIELD BLANK#1 4TH QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	2.2	17.3	17.3	ND	ND	ND	*.1
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	*1.0	*.6	ND	5.1	1.1	ND	1.0

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	FIELD BLANK#1 1ST QTR	FIELD BLANK#2 1ST QTR	FIELD BLANK#3 1ST QTR	FIELD BLANK#1 2ND QTR	FIELD BLANK#1 3RD QTR	FIELD BLANK#2 3RD QTR	FIELD BLANK#1 4TH QTR
41	DI-N-OCTYL PHTHALATE	1.0	*.7	*.6	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	42%	85%	58%	23%	83%	142%	84%
49	2-FLUOROBIPHENYL	50 UG/L	80%	92%	69%	35%	74%	297%	76%
50	4-TERPHENYL-D14	50 UG/L	63%	110%	113%	84%	99%	99%	98%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR	REAGENT BLANK#4 1ST QTR	REAGENT BLANK#5 1ST QTR	REAGENT BLANK#6 1ST QTR	REAGENT BLANK#7 1ST QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	54.5	1.9	11.1	2.8	25.8	2.1	15.0
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	9.9
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	1.3	1.5	#.6	#.9	#.8	#.5	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR	REAGENT BLANK#4 1ST QTR	REAGENT BLANK#5 1ST QTR	REAGENT BLANK#6 1ST QTR	REAGENT BLANK#7 1ST QTR
41	DI-N-OCTYL PHTHALATE	1.0	4.0	ND	ND	ND	ND	ND	1.4
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	81%	39%	82%	72%	53%	64%	72%
49	2-FLUOROBIPHENYL	50 UG/L	74%	63%	89%	72%	58%	65%	94%
50	4-TERPHENYL-D14	50 UG/L	59%	40%	83%	136%	104%	73%	88%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	REAGENT BLANK#1 2ND QTR	REAGENT BLANK#2 2ND QTR	REAGENT BLANK#3 2ND QTR	REAGENT BLANK#4 2ND QTR	REAGENT BLANK#5 2ND QTR	REAGENT BLANK#6 2ND QTR	REAGENT BLANK#1 3RD QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	#.4	1.7	ND	ND	ND	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	3.5	6.8	ND	ND	#.6	ND	3.8

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	REAGENT BLANK#1 2ND QTR	REAGENT BLANK#2 2ND QTR	REAGENT BLANK#3 2ND QTR	REAGENT BLANK#4 2ND QTR	REAGENT BLANK#5 2ND QTR	REAGENT BLANK#6 2ND QTR	REAGENT BLANK#1 3RD QTR
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	51%	59%	68%	72%	67%	70%	132%
49	2-FLUOROBIPHENYL	50 UG/L	50%	73%	80%	66%	78%	91%	123%
50	4-TERPHENYL-D14	50 UG/L	92%	97%	68%	70%	93%	49%	31%

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BASE-NEUTRAL EXTRACTABLES RESULTS

ND = NOT DETECTED

* = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	REAGENT BLANK#2 3RD QTR	REAGENT BLANK#3 3RD QTR	REAGENT BLANK#4 3RD QTR	REAGENT BLANK#5 3RD QTR	REAGENT BLANK#1 4TH QTR	REAGENT BLANK#2 4TH QTR
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	ND	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	1.1	*.8	ND	ND	1.1	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	REAGENT BLANK#2 3RD QTR	REAGENT BLANK#3 3RD QTR	REAGENT BLANK#4 3RD QTR	REAGENT BLANK#5 3RD QTR	REAGENT BLANK#1 4TH QTR	REAGENT BLANK#2 4TH QTR
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT						
48	NITROBENZENE-D5	50 UG/L	92%	61%	53%	44%	115%	41%
49	2-FLUOROBIPHENYL	50 UG/L	66%	79%	62%	65%	103%	42%
50	4-TERPHENYL-D14	50 UG/L	104%	81%	80%	106%	62%	60%

APPENDIX G5

Fresh Water Aquifer Acid Extractables

Analyses by:

Barringer-Magenta Ltd.
Rexdale, Ontario

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-1-85 1ST QTR	MSMW-1-85 1ST QTR DUPLICATE	MSMW-1-85 2ND QTR	MSMW-1-85 2ND QTR QC REPEAT	MSMW-1-85 3RD QTR	MSMW-3-85 2ND QTR	MSMW-3-85 2ND QTR QC REPEAT
1	PHENOL	.5	ND	ND	0.5	1.0	ND	0.9	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	103%	98%	57%	56%	<1%	59%	2%
13	2,4,4-TRIBROMOPHENOL	50 UG/L	91%	83%	71%	74%	23%	48%	

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-3-85 3RD QTR	MSMW-4-85 1ST QTR	MSMW-4-85 2ND QTR	MSMW-4-85 2ND QTR DUPLICATE	MSMW-4-85 3RD QTR	MSMW-4-85 3RD-QTR QC-REPEAT	MSMW-6-85 1ST QTR
1	PHENOL	.5	ND	ND	1.8	1.0	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	5.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	5.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	5.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	40%	71%	90%	80%	32%	18%	60%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	55%	70%	78%	46%	40%	30%	40%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-85 2ND QTR	MSMW-6-85 3RD QTR	MSMW-6-85 3RD QTR DUPLICATE	MSMW-7-85 1ST QTR	MSMW-7-85 1ST QTR DUPLICATE	MSMW-7-85 2ND QTR	MSMW-7-85 3RD QTR
1	PHENOL	.5	ND	ND	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	63%	<1%	27%	66%	60%	64%	80%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	48%	25%	28%	79%	79%	61%	55%

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ACID-EXTRACTABLES RESULTS

ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-7-85 3RD QTR DUPLICATE	MSMW-1-86 1ST QTR	MSMW-1-86 2ND QTR	MSMW-1-86 3RD QTR	MSMW-3-86 1ST QTR	MSMW-4-86 1ST QTR	MSMW-4-86 1ST QTR QC-REPEAT
1	PHENOL	.5	ND	ND	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	27%	80%	80%	24%	72%	98%	89%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	28%	51%	62%	20%	76%	57%	62%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-86 2ND QTR	MSMW-4-86 3RD QTR	MSMW-5-86 1ST QTR	MSMW-5-86 1ST QTR QC-REPEAT	MSMW-5-86 2ND QTR	MSMW-5-86 3RD QTR	MSMW-5-86 3RD QTR QC-REPEAT
1	PHENOL	.5	1.1	ND	ND	ND	1.0	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	60%	42%	80%	65%	73%	53%	58%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	57%	14%	79%	79%	69%	41%	34%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-6-86 1ST QTR	MSMW-6-86 2ND QTR	MSMW-6-86 3RD QTR	MSMW-7-86 1ST QTR	MSMW-7-86 2ND QTR	MSMW-7-86 3RD QTR	MSMW-8-86 1ST QTR
1	PHENOL	.5	ND	1.1	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:								
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	79%	34%	63%	94%	101%	44%	66%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	67%	26%	67%	70%	62%	28%	69%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-86 2ND QTR	MSMW-8-86 3RD QTR	MSMW-1-87 1ST QTR	MSMW-1-87 2ND QTR	MSMW-1-87 2ND QTR QC-REPEAT	MSMW-1-87 3RD QTR	MSMW-2-87 1ST QTR
1	PHENOL	.5	2.0	ND	ND	1.9	1.2	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:									
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	65%	38%	85%	56%	42%	41%	88%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	115%	32%	54%	64%	67%	44%	53%

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ACID-EXTRACTABLES RESULTS

ND = NOT DETECTED

= COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-2-87 2ND QTR	MSMW-2-87 2ND QTR DUPLICATE	MSMW-2-87 3RD QTR	MSMW-2-87 3RD QTR DUPLICATE	MSMW-3-87 1ST QTR	MSMW-3-87 2ND QTR	MSMW-3-87 3RD QTR
1	PHENOL	.5	0.7	ND	ND	ND	ND	1.9	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:									
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	58%	61%	47%	41%	92%	69%	40%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	58%	47%	21%	26%	72%	66%	37%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-4-87 1ST QTR	MSMW-4-87 2ND QTR	MSMW-4-87 3RD QTR	MSMW-4-87 3RD QTR QC-REPEAT	MSMW-5-87 1ST QTR	MSMW-5-87 2ND QTR	MSMW-5-87 3RD QTR
1	PHENOL	.5	*.2	ND	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	50%	18%	9%	107%	74%	56%	52%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	--	54%	8%	40%	80%	39%	49%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	MSMW-6-87 1ST QTR	MSMW-6-87 2ND QTR	MSMW-6-87 2ND QTR DUPLICATE	MSMW-6-87 3RD QTR	MSMW-7-87 1ST QTR	MSMW-7-87 2ND QTR	MSMW-7-87 3RD QTR
1 PHENOL	.5	0.7	ND	ND	ND	ND	1.0	ND
2 2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3 2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4 2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5 2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6 4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7 2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8 2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9 4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10 2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11 PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:								
	AMOUNT							
12 A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	59%	51%	62%	38%	66%	81%	59%
13 1,2,3-TRIBROMOPHENOL	50 UG/L	--	48%	68%	29%	75%	88%	36%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-8-87 1ST QTR	MSMW-8-87 2ND QTR	MSMW-8-87 2ND QTR QC-REPEAT	MSMW-8-87 3RD QTR	MSMW-9-87 1ST QTR	MSMW-9-87 1ST QTR DUPLICATE	MSMW-9-87 2ND QTR
1	PHENOL	.5	0.5	ND	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:								
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	58%	54%	68%	106%	108%	62%	61%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	—	50%	54%	54%	61%	74%	56%

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ACID-EXTRACTABLES RESULTS

ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-9-87 3RD QTR	MSMW-10-87 1ST QTR	MSMW-10-87 2ND QTR	MSMW-10-87 3RD QTR	MSMW-11-87 1ST QTR	MSMW-11-87 2ND QTR	MSMW-11-87 3RD QTR
1	PHENOL	.5	ND	ND	ND	ND	ND	1.0	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:									
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	31%	85%	60%	99%	108%	22%	50%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	29%	58%	45%	55%	90%	31%	36%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-12-87 1ST QTR LOST SAMP	MSMW-12-87 2ND QTR	MSMW-12-87 3RD QTR	MSMW-12-87 3RD QTR QC-REPEAT	MSMW-13-87 1ST QTR	MSMW-13-87 1ST QTR QC-REPEAT	MSMW-13-37 2ND QTR
1	PHENOL	.5		ND	ND	ND	ND	ND	2.3
2	2-CHLOROPHENOL	1.0		ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0		ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0		ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0		ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0		ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0		ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0		ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0		ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0		ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0		ND	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L		--	26%	38%	120%	58%	77%
13	1,2,3-TRIBROMOPHENOL	50 UG/L		--	37%	29%	77%	45%	128%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-13-87 3RD QTR	MSMW-14-87 1ST QTR	MSMW-14-87 2ND QTR	MSMW-14-87 3RD QTR	MSMW-15-87 1ST QTR	MSMW-15-87 2ND QTR	MSMW-15-87 4TH QTR
1	PHENOL	.5	ND	ND	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:								
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	39%	131%	45%	56%	88%	77%	44%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	33%	118%	56%	39%	67%	46%	42%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-15-87 4TH QTR QC-REPEAT	MSMW-15-87 4TH QTR DUPLICATE
1	PHENOL	.5	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND
3	2-NITROPHENOL	2.0	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND
9	4-NITROPHENOL	15.0	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT		
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	57%	57%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	41%	39%

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ACID-EXTRACTABLES RESULTS

ND = NOT DETECTED   # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	87-39-01 1ST QTR QA/QC	87-39-01 1ST QTR QA/QC-RPT	P8-86 1ST QTR QA/QC	P10-87-BLF 1ST QTR QA/QC	CITYW 1ST QTR QA/QC	CITYW 1ST QTR QA/QC-RPT	DIW 1ST QTR QA/QC
1	PHENOL	.5	ND	ND	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:								
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	49%	67%	47%	101%	89%	94%	81%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	--	--	--	68%	74%	86%	59%

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ACID-EXTRACTABLES RESULTS

ND = NOT DETECTED   * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MSMW-16-87 2ND QTR QA/QC	MSMW-16-87 3RD QTR QA/QC	MSMW-16-87 3RD QTR DUPLICATE	MSMW-16-87 3RD QTR DUPL(RPT)
1	PHENOL	.5	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT				
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	39%	32%	53%	<1%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	69%	38%	35%	32%

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SPIKED ACID EXTRACTABLES SAMPLES - PERCENT RECOVERY

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR	REAGENT BLANK#4 1ST QTR	REAGENT BLANK#5 1ST QTR	REAGENT BLANK#6 1ST QTR	REAGENT BLANK#7 1ST QTR
1	PHENOL	50.0	48	43	45	38	38	50	50
2	2-CHLOROPHENOL	50.0	91	90	90	75	68	86	91
3	2-NITROPHENOL	50.0	97	111	105	76	71	90	101
4	2,4-DIMETHYLPHENOL	50.0	40	27	37	58	43	32	12
5	2,4-DICHLOROPHENOL	50.0	92	66	151	79	70	88	98
6	4-CHLORO-3-METHYL PHENOL	50.0	107	79	78	85	70	87	93
7	2,4,6-TRICHLOROPHENOL	50.0	97	121	104	87	85	93	103
8	2,4-DINITROPHENOL	50.0	97	74	55	84	90	77	97
9	4-NITROPHENOL	50.0	1	15	<1	28	45	48	53
10	2-METHYL-4,6-DINITROPHENOL	50.0	132	112	105	103	100	86	106
11	PENTACHLOROPHENOL	50.0	116	134	128	70	105	83	104
	SURROGATE STANDARD RECOVERIES:								
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	91	83	83	88	64	90	99
13	1,2,3-TRIBROMOPHENOL	50 UG/L	—	—	—	68	95	82	81

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SPIKED ACID EXTRACTABLES SAMPLES - PERCENT RECOVERY

	COMPOUND	AMOUNT UG/L	MSMW-1-85 1ST QTR DUPLICATE	MSMW-4-85 1ST QTR	MSMW-10-87 1ST QTR	MSMW-11-87 1ST QTR	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR
1	PHENOL	50.0	38	27	46	36	35	32	45
2	2-CHLOROPHENOL	50.0	67	54	98	70	57	72	86
3	2-NITROPHENOL	50.0	70	64	98	70	59	72	82
4	2,4-DIMETHYLPHENOL	50.0	26	3	51	48	29	41	50
5	2,4-DICHLOROPHENOL	50.0	68	56	102	80	59	67	79
6	4-CHLORO-3-METHYL PHENOL	50.0	73	44	102	82	70	72	79
7	2,4,6-TRICHLOROPHENOL	50.0	88	70	115	90	82	76	91
8	2,4-DINITROPHENOL	50.0	93	123	104	83	101	56	62
9	4-NITROPHENOL	50.0	48	54	29	50	40	24	34
10	2-METHYL-4,6-DINITROPHENOL	50.0	98	113	117	94	86	80	85
11	PENTACHLOROPHENOL	50.0	108	107	90	127	96	63	73

SURROGATE STANDARD RECOVERIES:

		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	66	62	133	87	59	71	81
13	1,2,3-TRIBROMOPHENOL	50 UG/L	97	74	99	101	83	65	85

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SPIKED ACID EXTRACTABLES SAMPLES - PERCENT RECOVERY

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#4 2ND QTR	REAGENT BLANK#5 2ND QTR	MSMW-4-85 2ND QTR	MSMW-7-85 2ND QTR	MSMW-5-87 2ND QTR	MSMW-16-87 2ND QTR	REAGENT BLANK#1 3RD QTR
1	PHENOL	50.0	46	26	50	31	49	42	29
2	2-CHLOROPHENOL	50.0	78	50	75	56	51	63	45
3	2-NITROPHENOL	50.0	75	57	74	53	65	67	50
4	2,4-DIMETHYLPHENOL	50.0	47	15	31	6	6	11	33
5	2,4-DICHLOROPHENOL	50.0	72	55	73	53	71	69	48
6	4-CHLORO-3-METHYL PHENOL	50.0	84	59	81	52	75	72	54
7	2,4,6-TRICHLOROPHENOL	50.0	88	66	85	61	92	82	53
8	2,4-DINITROPHENOL	50.0	94	58	91	87	140	72	59
9	4-NITROPHENOL	50.0	48	16	39	45	73	38	28
10	2-METHYL-4,6-DINITROPHENOL	50.0	98	72	108	89	136	79	60
11	PENTACHLOROPHENOL	50.0	90	63	93	95	163	77	45

SURROGATE STANDARD RECOVERIES:

		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	77		77	52	42	69	56
13	1,2,3-TRIBROMOPHENOL	50 UG/L	88	78	104	81	70	67	56

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SPIKED ACID EXTRACTABLES SAMPLES - PERCENT RECOVERY

	COMPOUND	AMOUNT UG/L	REAGENT BLANK#2 3RD QTR	MSMW-3-85 3RD QTR	MSMW-1-86 3RD QTR	MSMW-9-87 3RD QTR	REAGENT BLANK#1 4TH QTR
1	PHENOL	50.0	25	41	38	58	32
2	2-CHLOROPHENOL	50.0	51	68	71	90	56
3	2-NITROPHENOL	50.0	47	68	68	86	65
4	2,4-DIMETHYLPHENOL	50.0	11	22	25	7	23
5	2,4-DICHLOROPHENOL	50.0	48	65	66	76	70
6	4-CHLORO-3-METHYL PHENOL	50.0	47	84	66	74	110
7	2,4,6-TRICHLOROPHENOL	50.0	51	80	66	74	92
8	2,4-DINITROPHENOL	50.0	42	136	37	71	94
9	4-NITROPHENOL	50.0	21	65	26	34	47
10	2-METHYL-4,6-DINITROPHENOL	50.0	65	128	57	91	92
11	PENTACHLOROPHENOL	50.0	65	102	49	77	116

SURROGATE STANDARD RECOVERIES:

		AMOUNT					
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	37	46	83	37	50
13	1,2,3-TRIBROMOPHENOL	50 UG/L	51	61	67	33	70

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ACID-EXTRACTABLES RESULTS

ND = NOT DETECTED

= COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	FIELD BLANK#1 1ST QTR	FIELD BLANK#2 1ST QTR	FIELD BLANK#3 1ST QTR	FIELD BLANK#1 2ND QTR	FIELD BLANK#1 3RD QTR	FIELD BLANK#2 3RD QTR	FIELD BLANK#1 4TH QTR
1	PHENOL	.5	ND	ND	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:								
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	47%	58%	68%	25%	48%	<1%	62%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	--	73%	69%	62%	37%	25%	60%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR	REAGENT BLANK#4 1ST QTR	REAGENT BLANK#5 1ST QTR	REAGENT BLANK#6 1ST QTR	REAGENT BLANK#7 1ST QTR
1	PHENOL	.5	ND	ND	ND	ND	ND	ND	43.2
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	1.9
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	97%	58%	103%	104%	57%	72%	105%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	--	--	64%	67%	79%	64%	66%

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ACID-EXTRACTABLES RESULTS

ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	REAGENT BLANK#1 2ND QTR	REAGENT BLANK#2 2ND QTR	REAGENT BLANK#3 2ND QTR	REAGENT BLANK#4 2ND QTR	REAGENT BLANK#5 2ND QTR	REAGENT BLANK#6 2ND QTR	REAGENT BLANK#1 3RD QTR
1	PHENOL	.5	ND	6.5	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:								
		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	49%	63%	56%	69%	71%	--	122%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	65%	56%	65%	54%	78%	59%	56%

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ACID-EXTRACTABLES RESULTS

ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D

	COMPOUND	M.D.L. UG/L	REAGENT BLANK#2 3RD QTR	REAGENT BLANK#3 3RD QTR	REAGENT BLANK#4 3RD QTR	REAGENT BLANK#5 3RD QTR	REAGENT BLANK#1 4TH QTR	REAGENT BLANK#2 4TH QTR
1	PHENOL	.5	ND	ND	ND	ND	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT						
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	90%	47%	39%	36%	86%	32%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	11%	40%	34%	33%	49%	34%

APPENDIX G6

Fresh Water Aquifer
Organochlorine Compounds

Analyses by:

Barringer-Magenta Ltd.
Rexdale, Ontario

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED ‡ = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-1-85 1ST QTR	MSMW-1-85 1ST QTR QC REPEAT	MSMW-1-85 1ST QTR DUPLICATE	MSMW-1-85 2ND QTR	MSMW-1-85 3RD QTR	MSMW-3-85 2ND QTR	MSMW-3-85 3RD QTR
1 HEXACHLOROBENZENE	.0010	0.0010	‡.0010	‡.0010	ND	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS   ND = NOT DETECTED $ = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-4-85 1ST QTR	MSMW-4-85 2ND QTR	MSMW-4-84 2ND QTR DUPLICATE	MSMW-4-85 3RD QTR	MSMW-6-85 1ST QTR	MSMW-6-85 2ND QTR	MSMW-6-85 3RD QTR
1 HEXACHLOROBENZENE	.0010	0.0020	ND	ND	ND	$.0040	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS   ND = NOT DETECTED $ = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-6-85 3RD QTR DUPLICATE	MSMW-7-85 1ST QTR	MSMW-7-85 1ST QTR QC REPEAT	MSMW-7-85 1ST QTR DUPLICATE	MSMW-7-85 2ND QTR	MSMW-7-85 3RD QTR	MS 3 QC-RE
1 HEXACHLOROBENZENE	.0010	ND	$.0015	$.0015	0.0017	ND	ND	
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	

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ORGANOCHLORINE COMPOUNDS RESULTS

ND = NOT DETECTED

= AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-7-85 3RD QTR DUPLICATE	MSMW-1-86 1ST QTR	MSMW-1-86 1ST QTR QC-REPEAT	MSMW-1-86 2ND QTR	MSMW-1-86 3RD QTR	MSMW-3-86 1ST QTR	MSMW-4-86 1ST QTR
1 HEXACHLOROBENZENE	.0010	ND	0.0040	0.0046	ND	ND	#.0010	0.0047
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-4-86 2ND QTR	MSMW-4-86 3RD QTR	MSMW-5-86 1ST QTR	MSMW-5-86 2ND QTR	MSMW-5-86 3RD QTR	MSMW-6-86 1ST QTR	MSMW-6-86 2ND QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	*.0016	ND	ND	0.0030	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS

ND = NOT DETECTED

= AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-6-86 3RD QTR	MSMW-7-86 1ST QTR	MSMW-7-86 2ND QTR	MSMW-7-86 3RD QTR	MSMW-7-86 3RD QTR QC-REPEAT	MSMW-8-86 1ST QTR	MSMW-8-86 2ND QTR
1 HEXACHLOROBENZENE	.0010	ND	0.0054	ND	ND	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS   ND = NOT DETECTED   * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-8-86 3RD QTR	MSMW-8-86 3RD QTR QC-REPEAT	MSMW-1-87 1ST QTR	MSMW-1-87 2ND QTR	MSMW-1-87 3RD QTR	MSMW-2-87 1ST QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	0.0061	ND	ND	0.0040
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS　　ND = NOT DETECTED　　# = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-2-87 2ND QTR QC-REPEAT	MSMW-2-87 2ND QTR DUPLICATE	MSMW-2-87 2ND QTR DUPL(RPT)	MSMW-2-87 3RD QTR	MSMW-2-87 3RD QTR DUPLICATE	MSMW-3-87 1ST QTR	MSMW-3-87 2ND QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND	#.0015	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS

ND = NOT DETECTED

= AMONUT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-3-87 3RD QTR	MSMW-4-87 1ST QTR	MSMW-4-87 2ND QTR	MSMW-4-87 3RD QTR	MSMW-5-87 1ST QTR	MSMW-5-87 2ND QTR LOST SAMP	MSMW-5-87 3RD QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND		ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND		ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND		ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND		ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND		ND
6 MIREX	.0010	ND	ND	ND	ND	ND		ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND		ND

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ORGANOCHLORINE COMPOUNDS RESULTS

ND = NOT DETECTED

= AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-6-87 1ST QTR	MSMW-6-87 2ND QTR	MSMW-6-87 2ND QTR DUPLICATE	MSMW-6-87 3RD QTR	MSMW-7-87 1ST QTR	MSMW-7-87 2ND QTR	MSMW-7-87 3RD QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS   ND = NOT DETECTED $ = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-8-87 1ST QTR	MSMW-8-87 2ND QTR	MSMW-8- 3RD QTR	MSMW-9-87 1ST QTR	MSMW-9-87 2ND QTR	MSMW-9-87 3RD QTR	MSMW-10-87 1ST QTR
1 HEXACHLOROBENZENE	.0010	ND	0.0015	ND	$.0012	ND	ND	0.0043
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	0.0013	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-10-87 2ND QTR	MSMW-10-87 3RD QTR	MSMW-11-87 1ST QTR	MSMW-11-87 2ND QTR	MSMW-11-87 3RD QTR	MSMW-11-87 3RD QTR QC-REPEAT	MSMW-12-87 1ST QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND	ND	0.0022
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED ‡ = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-12-87 2ND QTR	MSMW-12-87 2ND QTR QC-REPEAT	MSMW-12-87 3RD QTR	MSMW-13-87 1ST QTR	MSMW-13-87 2ND QTR	MSMW-13-87 3RD QTR	MSMW-14-8 1ST QT
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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DATE:

ORGANOCHLORINE COMPOUNDS RESULTS   ND = NOT DETECTED   * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-14-87 1ST QTR QC-REPEAT	MSMW-14-87 2ND QTR	MSMW-14-87 2ND QTR QC-REPEAT	MSMW-14-87 3RD QTR	MSMW-14-87 3RD QTR QC-REPEAT	MSMW-15-87 1ST QTR	MSMW-15-87 2ND QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND	0.0040	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-15-87 4TH QTR	MSMW-15-87 4TH QTR DUPLICATE	MSMW-15-87 4TH QTR QC-REPEAT
1 HEXACHLOROBENZENE	.0010	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND
6 MIREX	.0010	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED # = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	87-39-01 1ST QTR QA/QC	P8-86 1ST QTR QA/QC	P10-87-BLF 1ST QTR QA/QC	CITYW 1ST QTR QA/QC	DIW 1ST QTR QA/QC	MSMW-16-87 2ND QTR QA/QC	MSMW-16-87 3RD QTR QA/QC
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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PAGE :

ORGANOCHLORINE COMPOUNDS RESULTS   ND = NOT DETECTED   # = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	MSMW-16-87 3RD QTR QA/QC DUPL
1 HEXACHLOROBENZENE	.0010	ND
2 HEPTACHLOR	.0005	ND
3 ALDRIN	.0005	#.0005
4 OCTACHLOROSTYRENE	.0010	ND
5 PP'-DDE	.0005	ND
6 MIREX	.0010	ND
7 TOTAL PCB'S	.0100	ND

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DATE:

PAGE II/II

SPIKED ORGANOCHLORINE SAMPLES - PERCENT RECOVERIES

COMPOUND	AMOUNT UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR	REAGENT BLANK#4 1ST QTR	REAGENT BLANK#5 1ST QTR	REAGENT BLANK#6 1ST QTR	REAGENT BLANK#7 1ST QTR
1 HEXACHLOROBENZENE	0.0250	79	108		98	82		100
2 HEPTACHLOR	0.0250	89	94		101	90		97
3 ALDRIN	0.0250	87	90		100	83		89
4 OCTACHLOROSTYRENE	0.0250	85	93		104	91		94
5 PP'-DDE	0.0250	88	99		107	91		86
6 MIREX	0.0700	92	106		106	77		80
7 TOTAL PCB'S	0.2500			99			112	

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DATE:

PAGE II/II

SPIKED ORGANOCHLORINE SAMPLES - PERCENT RECOVERIES

COMPOUND	AMOUNT UG/L	87-39-01 1ST QTR	MSMW-2-87 1ST QTR	MSMW-5-87 1ST QTR	MSMW-7-87 1ST QTR	MSMW-9-87 1ST QTR	REAGENT BLANK#1 2ND QTR	REAGENT BLANK#2 2ND QTR
1 HEXACHLOROBENZENE	0.0250	87	98	98		85	86	78
2 HEPTACHLOR	0.0250	88	116	92		89	77	83
3 ALDRIN	0.0250	90	103	95		81	93	78
4 OCTACHLOROSTYRENE	0.0250	90	110	95		87	92	81
5 PP'-DDE	0.0250	89	110	90		82	91	80
6 MIREX	0.0700	91	125	89		87	88	83
7 TOTAL PCB'S	0.2500				107			

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W.O. #

SPIKED ORGANOCHLORINE SAMPLES - PERCENT RECOVERIES

COMPOUND	AMOUNT UG/L	REAGENT BLANK03 2ND QTR	REAGENT BLANK04 2ND QTR	REAGENT BLANK05 2ND QTR	SAMP. 4 MSMW-4-85 DUPLICATE	MSMW-4-87 2ND QTR	MSMW-11-87 2ND QTR	MSMW-15-87 2ND QTR
1 HEXACHLOROBENZENE	0.0250	122		72		67	87	81
2 HEPTACHLOR	0.0250	97		70		71	67	88
3 ALDRIN	0.0250	109		75		67	94	97
4 OCTACHLOROSTYRENE	0.0250	125		75		69	101	117
5 PP'-DDE	0.0250	121		70		68	78	97
6 MIREX	0.0700	113		75		67	109	107
7 TOTAL PCB'S	0.2500		90		102			

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DATE:

PAGE II/I

SPIKED ORGANOCHLORINE SAMPLES - PERCENT RECOVERIES

COMPOUND	AMOUNT UG/L	REAGENT BLANK#1 3RD QTR	REAGENT BLANK#2 3RD QTR	REAGENT BLANK#3 3RD QTR	REAGENT BLANK#4 3RD QTR	REAGENT BLANK#5 3RD QTR	REAGENT BLANK#6 3RD QTR	MSM 3 DUPLI
1 HEXACHLOROBENZENE	0.0250		65	52	63		70	
2 HEPTACHLOR	0.0250		67	57	71		72	[illegible]
3 ALDRIN	0.0250		60	53	60		63	
4 OCTACHLOROSTYRENE	0.0250		63	58	62		67	
5 PP'-DDE	0.0250		85	77	78		92	[illegible]
6 MIREX	0.0700		87	78	79		88	
7 TOTAL PCB'S	0.2500	97				93		

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W.O. #

ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED ‡ = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	FIELD BLANK#1 1ST QTR	FIELD BLANK#2 1ST QTR	FIELD BLANK#3 1ST QTR	FIELD BLANK#4 1ST QTR	FIELD BLANK#1 2ND QTR	FIELD BLANK#1 3RD QTR	FIELD BLANK#2 3RD QTR
1 HEXACHLOROBENZENE	.0010	ND	0.0050	ND	‡.0017	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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PAGE II/II

ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	FIELD BLANK#1 4TH QTR
1 HEXACHLOROBENZENE	.0010	ND
2 HEPTACHLOR	.0005	ND
3 ALDRIN	.0005	ND
4 OCTACHLOROSTYRENE	.0010	ND
5 PP'-DDE	.0005	ND
6 MIREX	.0010	ND
7 TOTAL PCB'S	.0100	ND

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W.O. #

ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED # = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	REAGENT BLANK#1 1ST QTR	REAGENT BLANK#2 1ST QTR	REAGENT BLANK#3 1ST QTR	REAGENT BLANK#4 1ST QTR	REAGENT BLANK#5 1ST QTR	REAGENT BLANK#6 1ST QTR	REAGENT BLANK#7 1ST QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	0.0050	0.0018	#.0015
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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W.O. #

ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED # = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	REAGENT BLANK#8 1ST QTR	REAGENT BLANK#9 1ST QTR	REAGENT BLANK#1 2ND QTR	REAGENT BLANK#2 2ND QTR	REAGENT BLANK#3 2ND QTR	REAGENT BLANK#4 2ND QTR	REAGENT BLANK#1 3RD QTR
1 HEXACHLOROBENZENE	.0010	0.0042	0.0017	0.0017	ND	ND	ND	0.0017
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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SPIKED ORGANOCHLORINE SAMPLES - PERCENT RECOVERIES

COMPOUND	AMOUNT UG/L	MSMW-6-86 3RD QTR	MSMW-6-87 3RD QTR	MSMW-13-87 3RD QTR	REAGENT BLANK#1 4TH QTR	REAGENT BLANK#2 4TH QTR
1 HEXACHLOROBENZENE	0.0250		80	94	78	
2 HEPTACHLOR	0.0250		89	110	99	
3 ALDRIN	0.0250		71	89	100	
4 OCTACHLOROSTYRENE	0.0250		74	95	101	
5 PP'-DDE	0.0250		92	120	110	
6 MIREX	0.0700		91	123	109	
7 TOTAL PCB'S	0.2500	64				97

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W.O. # DATE: PAGE XI/XI

ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	REAGENT BLANK#1 3RD QTR	REAGENT BLANK#2 3RD QTR	REAGENT BLANK#3 3RD QTR	REAGENT BLANK#4 3RD QTR	REAGENT BLANK#5 3RD QTR	REAGENT BLANK#1 4TH QTR	REAG BLAN 4TH QT
1 HEXACHLOROBENZENE	.0010	0.0017	ND	ND	ND	ND	ND	N
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

APPENDIX H

"Westbay" Casing Installation Log and Casing Completion Summary

Borehole MDMW-1

Sheet 1 of 10

MP System
Casing Installation Log

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-039)
WB Ref: WB 538-87
Location: SARNIA, ONTARIO
Hole No: MDMW-1
Installed by: R.S. / A.S.
Hole Depth: 303 m
MP Depth: 300 m
Hole Diameter: HQ (4½")
Date Installed: OCT. 22, 23, 24, 2 1987
Measurement Datum: GROUND SURFACE
Datum Elevation:
Date Drawn:

Depth. (m)	Geological Description	Geologic Log	MP Casing Log	Depth(m) (Serial No. Batch No.)	Final Packer Pressure/Volume	Comments	Joint Tests joint	pass
0			137	1.4		STEEL CASING STICK-UP = 0.4 m	137 136	✓ ✓
			136	2.9		STICK-UP OF CUT MP ABOVE G.S. = 0.9 m	135	✓
3			135			(0.625m CUT OFF) DISTANCE FROM TOP OF CUT MP TO		
				5.9		CENTER OF NEXT COUPLING = 0.81 m	134	✓
6			134					
				8.9		NOTE: JOINT TEST CONSTITUTES HYDRAULIC	133	✓
9			133			PRESSURE OF ~100 psi BEING APPLIED TO JOINT		
				11.9		FOR 1 MIN. MINIMUM.	132	✓
12			132					
				14.9			131	✓
15			131	(87-122) 16.4			130	✓
			130	(87-122) 17.9			129	✓
18			129					
				20.9			128	✓
21		OVERBURDEN	128					
				23.9			127	✓
24			127					
			●	26.9			126	✓
27			126	(3056)				
30			125	29.9			125	✓

Regular MP Casing
MP Packer
Settlement Casing
● Measurement Port Coupling
○ Pumping Port Coupling
Regular Coupling

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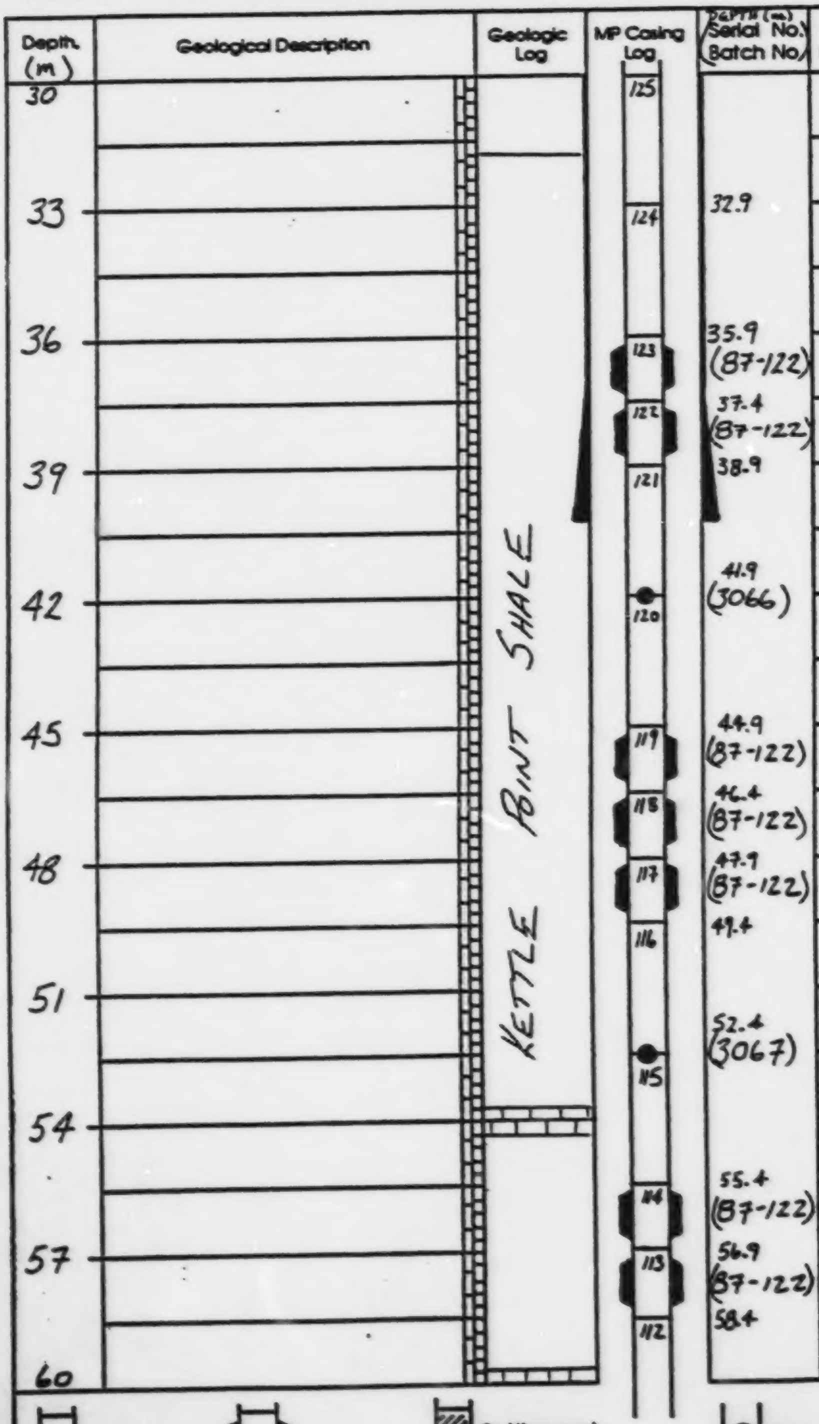
Sheet 2 of 10

MP System
Casing Installation Log

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-039)
WB Ref: WB 538-87
Location: SARNIA, ONTARIO
Hole No: MDMW - 1
Installed by: R.S. / A.S.
Hole Depth: 303 m
MP Depth: 300 m
Hole Diameter: HQ (4½")
Date Installed: Oct. 22, 23, 24, 2
1987
Measurement Datum: GROUND SURFACE
Datum Elevation:
Date Drawn:

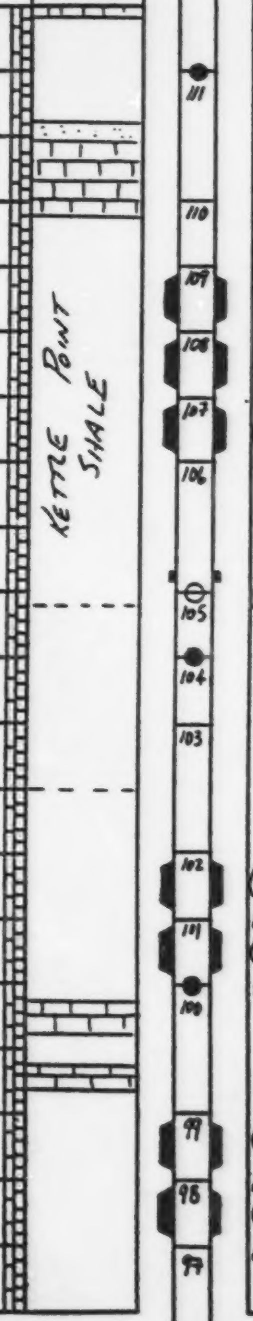

Depth (m)
Geological Description
Geologic Log
MP Casing Log
30
33
36
39
42
45
48
51
54
57
60
KETTLE POINT SHALE
125
124
123
122
121
120
119
118
117
116
115
114
113
112
Regular MP Casing
MP Packer
Settlement Casing
Measurement Port Coupling
Pumping Port Coupling
Regular Coupling

Depth (m) Serial No./Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	pass
			125	✓
32.9			124	✓
35.9 (87-122)			123	✓
37.4 (87-122)			122	✓
38.9		HW (4" I.D.) STEEL CASING TO 40.8 m	121	✓
41.9 (3066)			120	✓
44.9 (87-122)			119	✓
46.4 (87-122)			118	✓
47.9 (87-122)			117	✓
49.4			116	✓
52.4 (3067)			115	✓
55.4 (87-122)			114	✓
56.9 (87-122)			113	✓
58.4			112	✓

Sheet 3 of 10

MP System
Casing Installation Log

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-039) WB Ref: WB 538-87
Location: SARNIA, ONTARIO Hole No: MDMW-1 Installed by: R.S./A.S.
Hole Depth: 303 m MP Depth: 300 m Hole Diameter: HQ (4½") Date Installed: Oct. 22, 23, 24, 25 1987
Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn:



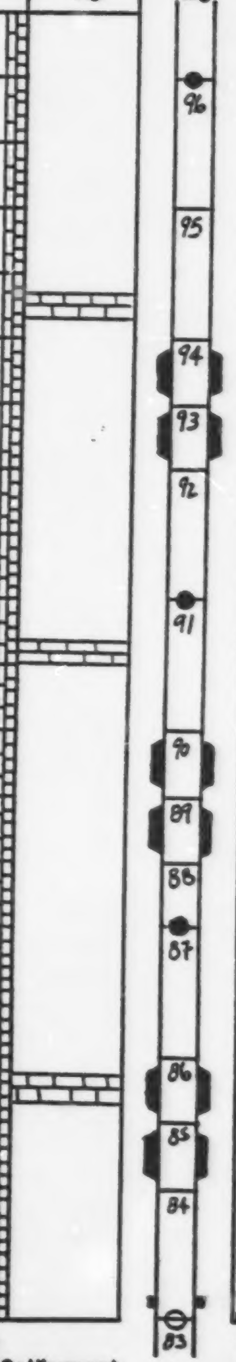
Depth (M)	Geological Description	Depth(m) (Serial No.) Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	pass
60						
		(1916) 61.4			111	✓
63						
		64.4			110	✓
66		65.9 (87-122)		RE-INFORCING STAINLESS STEEL CLAMPS ADDED TO JOINTS	109	✓
		67.4 (87-122)			108	✓
69		68.9 (87-122)			107	✓
		70.4			106	✓
72						
		MAGNETIC (1652) 73.4	LOCATION COLLAR		105	✓
75	GAS ZONE Pi ≈ 100psi	(105) 74.9	STAINLESS STEEL MEASUREMENT PORT		104	✓
		76.4			103	✓
78						
		79.4 (87-122)			102	✓
81		80.9 (87-122)			101	✓
		82.4			100	✓
84						
		85.4 (87-122)			99	✓
87		86.9 (87-122)			98	✓
		88.4			97	✓
90						

▯ Regular MP Casing
● MP Packer
▨ Settlement Casing
● Measurement Port Coupling
○ Pumping Port Coupling
⊢ Regular Coupling

Sheet

MP Syste
Casing Installation L

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-039) WB Ref: WB 53
Location: SARNIA, ONTARIO Hole No: MDMW-1 Installed by: R.S./
Hole Depth: 303 m MP Depth: 300 m Hole Diameter: HQ (4½") Date Installed: OCT. 22, 1
Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn:



Depth (m)	Geological Description	Geologic Log	MP Casing Log	Depth (m) Serial No. (Batch No.)	Final Packer Pressure/Volume	Comments	Jo
90						↑ RE-INFORCING STAINLESS STEEL CLAMPS ADDED TO JOINTS ↓	
			96	91.4 (3083)			96
93							
			95	94.4			9
96							
			94	97.4 (87-122)			
99			93	98.9 (87-122)			9
			92	100.4			92
102							
			91	103.4 (3087)			9
105							
			90	106.4 (87-122)			90
108			89	107.9 (87-122)			89
			88	109.4			88
111			87	110.9 (3090)			87
114			86	113.9 (87-122)			86
			85	115.4 (87-122)			85
117			84	116.9			84
	GAS ODOR ON CORE						
120			83	MAGNETIC LOCATION COLLAR (1654) 119.9			83

Regular MP Casing
MP Packer
Settlement Casing
● Measurement Port Coupling
○ Pumping Port Coupling
Regula Coupli

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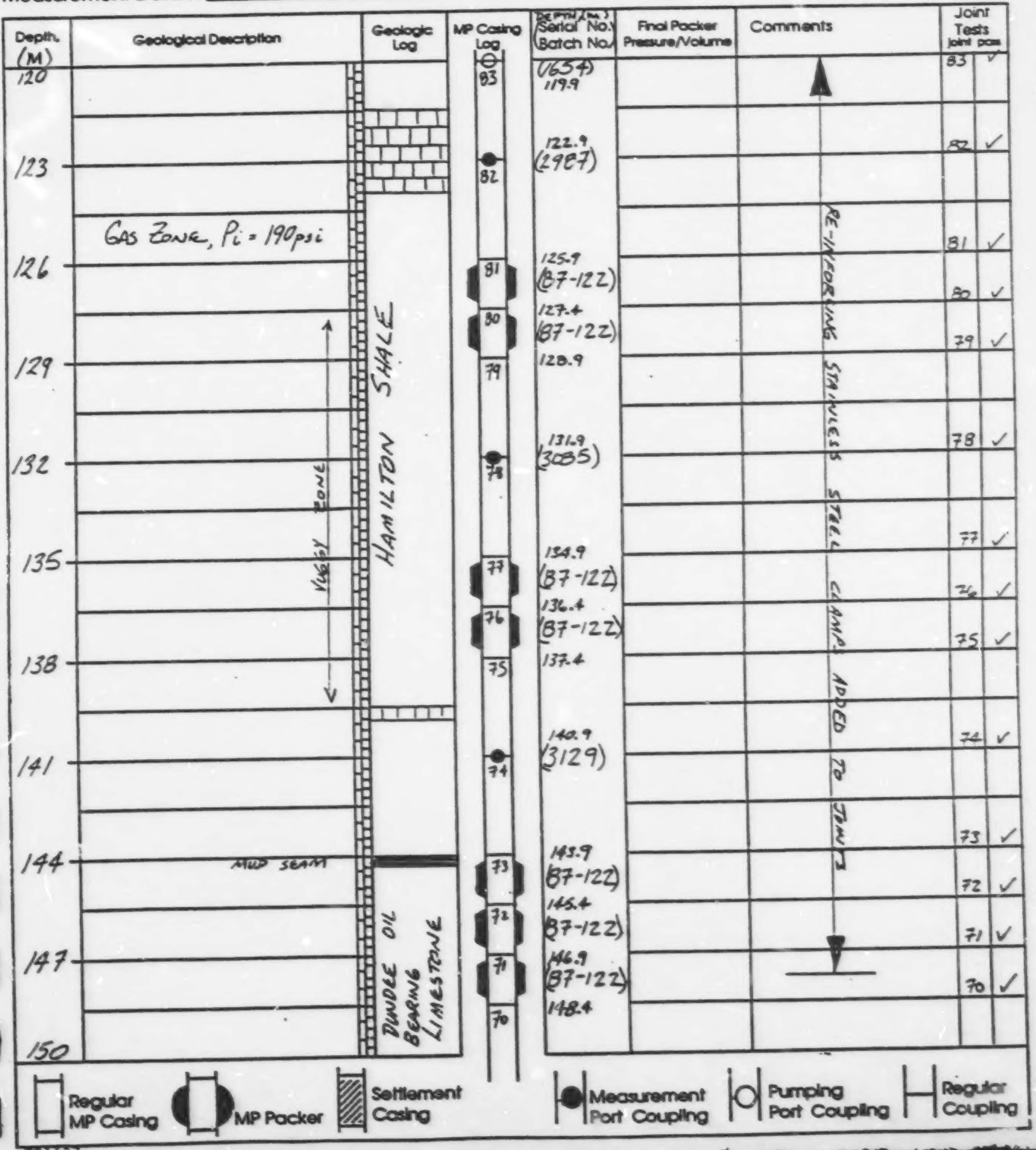
Sheet 5 of 10

MP System
Casing Installation Log

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-039) WB Ref: WB 538-87
Location: SARNIA, ONTARIO Hole No: MDMW-1 Installed by: R.S./A.S.
Hole Depth: 303m MP Depth: 300m Hole Diameter: HQ (4½") Date Installed: OCT. 22, 23 24, 2: 1987
Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn:


Depth (M)
Geological Description
Geologic Log
MP Casing Log
DEPTH (M) (Serial No.) (Batch No.)
Final Packer Pressure/Volume
Comments
Joint Tests
joint
pass
120
123
126
129
132
135
138
141
144
147
150
GAS ZONE, Pi = 190psi
VUGGY ZONE
MUD SEAM
HAMILTON SHALE
DUNDEE OIL BEARING LIMESTONE
83
82
81
80
79
78
77
76
75
74
73
72
71
70
(U654)
119.9
122.9
(2987)
125.9
(87-122)
127.4
(87-122)
128.9
131.9
(3085)
134.9
(87-122)
136.4
(87-122)
137.4
140.9
(3129)
143.9
(87-122)
145.4
(87-122)
146.9
(87-122)
148.4
RE-INFORCING STAINLESS STEEL CLAMPS ADDED TO JOINTS
83 ✓
82 ✓
81 ✓
80 ✓
79 ✓
78 ✓
77 ✓
76 ✓
75 ✓
74 ✓
73 ✓
72 ✓
71 ✓
70 ✓
Regular MP Casing
MP Packer
Settlement Casing
Measurement Port Coupling
Pumping Port Coupling
Regular Coupling

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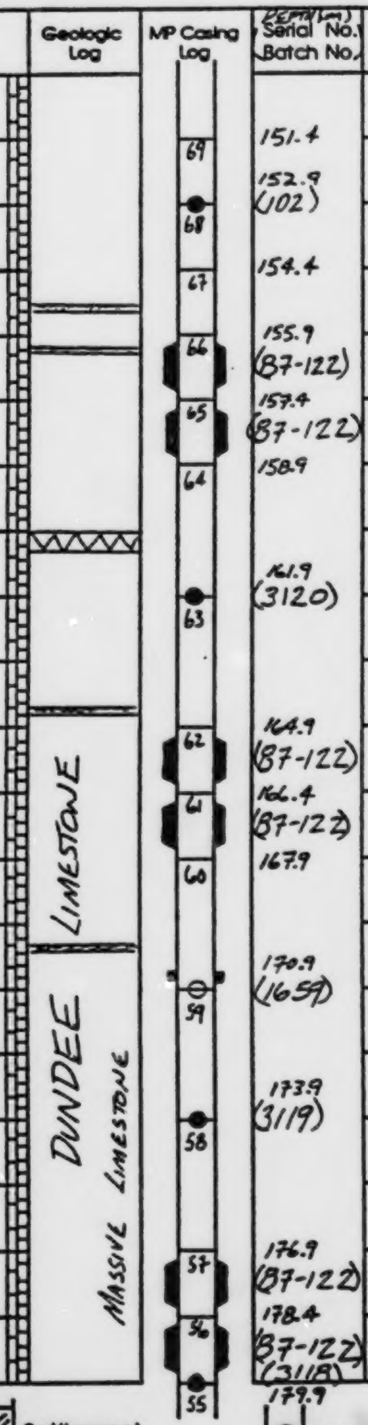
Sheet 6 of 10

MP System
Casing Installation Log

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-039) WB Ref: WB 538-87
Location: SARNIA, ONTARIO Hole No: MDMW-1 Installed by: R.S./A.S.
Hole Depth: 303 M MP Depth: 300 M Hole Diameter: HQ (4½") Date Installed: OCT. 23-25/87
Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn:



Depth (m)	Geological Description	Geologic Log	MP Casing Log	Depth (m) Serial No. Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	pass
150	OIL BEARING (150 to ~170)						69	✓
			69	151.4				
153			● 68	152.9 (102)		STAINLESS STEEL MEASUREMENT PORT	68	✓
			67	154.4			67	✓
156	MUD SEAMS						66	✓
			66	155.9 (87-122)			65	✓
			65	157.4 (87-122)			64	✓
159			64	158.9				
	POROUS CORAL							
162			● 63	161.9 (3120)			63	✓
165	MUD SEAM	LIMESTONE					62	✓
			62	164.9 (87-122)			61	✓
			61	166.4 (87-122)			60	✓
168			60	167.9				
	MUD SEAM							
171		DUNDEE MASSIVE LIMESTONE	○ 59	170.9 (1659)		MAGNETIC LOCATION COLLAR	59	✓
174			● 58	173.9 (3119)			58	✓
177			57	176.9 (87-122)			57	✓
			56	178.4 (87-122) (3118)			56	✓
180			● 55	179.9			55	✓

Regular MP Casing | MP Packer | Settlement Casing | ● Measurement Port Coupling | Pumping Port Coupling | Regular Coupling

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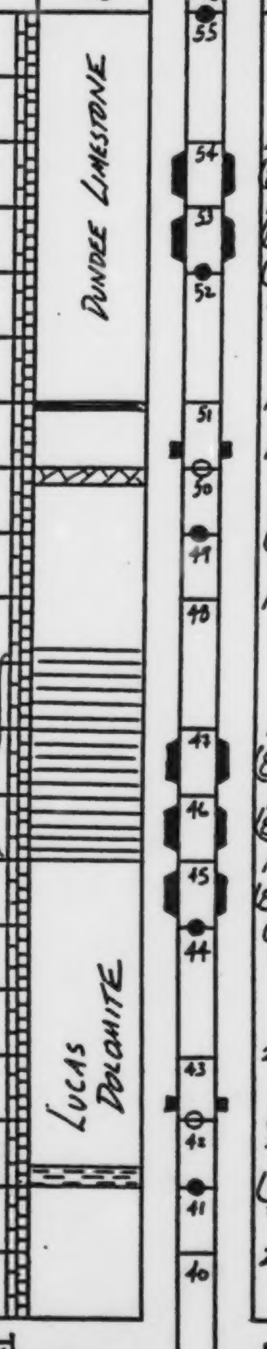
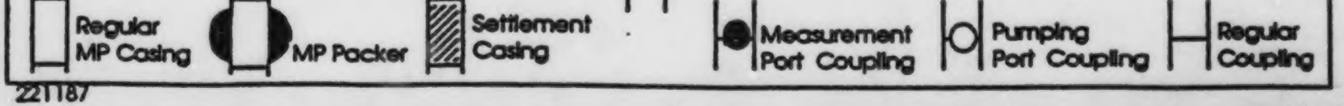
Sheet 7 of 10

MP System
Casing Installation Log

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-039) WB Ref: WB 538-87
Location: SARNIA, ONTARIO Hole No: MDMW-1 Installed by: R.S./A.S.
Hole Depth: 303 m MP Depth: 300 m Hole Diameter: HQ (4½") Date Installed: OCT. 23-25/
Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn:

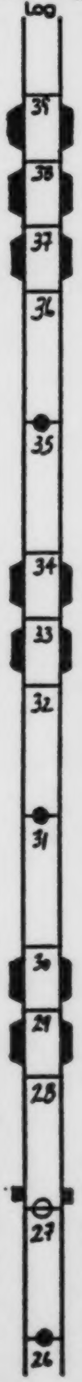

DUNDEE LIMESTONE
LUCAS DOLOMITE
55
54
53
52
51
50
49
48
47
46
45
44
43
42
41
40

Depth (M)	Geological Description	Depth/Serial No./Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	pass
180		(3118) 179.9			55	✓
183		182.9			54	✓
		(87-122) 184.4			53	✓
		(87-126)			52	✓
186		(3117) 185.9				
189		188.9			51	✓
		190.4		MAGNETIC LOCATION COLLAR	50	✓
	POROUS DOLOMITE SULPHUROUS ODOR	(463)		STAINLESS STEEL PUMPING PORT		
192		191.4 (104)		STAINLESS STEEL MEASUREMENT PORT.	49	✓
		193.4			48	✓
195						
	ANHYDRITE SEAMS	196.4			47	✓
198		(87-122) 197.9			46	✓
		(87-122) 199.4			45	✓
201		(87-122) (3115) 200.9			44	✓
204		203.9			43	✓
		(464) 205.4		MAGNETIC LOCATION COLLAR STAINLESS STEEL PUMPING PORT	42	✓
207	BITUMEN & SULPHUR INFILLING	(103) 206.9		STAINLESS STEEL MEASUREMENT PORT.	41	✓
		208.4			40	✓
210						


Regular MP Casing
MP Packer
Settlement Casing
Measurement Port Coupling
Pumping Port Coupling
Regular Coupling

MP System
Casing Installation Log

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-089)
WB Ref: WB 538-87
Location: SARNIA, ONTARIO
Hole No: MDMW-1
Installed by: R.S./A.S.
Hole Depth: 303 m
MP Depth: 300 m
Hole Diameter: HQ (4½")
Date Installed: OCT. 23-25/87
Measurement Datum: GROUND SURFACE
Datum Elevation:
Date Drawn:



Depth (m)	Geological Description	Geologic Log	Depth (m) / Serial No. / Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
210		LUCAS DOLOMITE TIGHT FRACTURES				39	✓
			211.4 (87-122)			38	✓
213			212.9 (87-122)			37	✓
			214.4 (87-122)			36	✓
216			215.9				
219			(3116) 218.9			35	✓
222			221.9 (87-122)			34	✓
			223.4 (87-122)			33	✓
225			224.9			32	✓
228			(3113) 227.9			31	✓
		MASSIVE DOLOMITE			LEAKS AT FIRST, REPLACED COUPLING - THEN O.K.	30	X ✓
231			230.9 (87-122)			29	✓
			232.4 (87-122)			28	✓
234			233.9				
237		GYPSUM ANHYDRITE	236.9 (1660)		MAGNETIC LOCATION COLLAR	27	✓
240			(3114) 239.9			26	✓

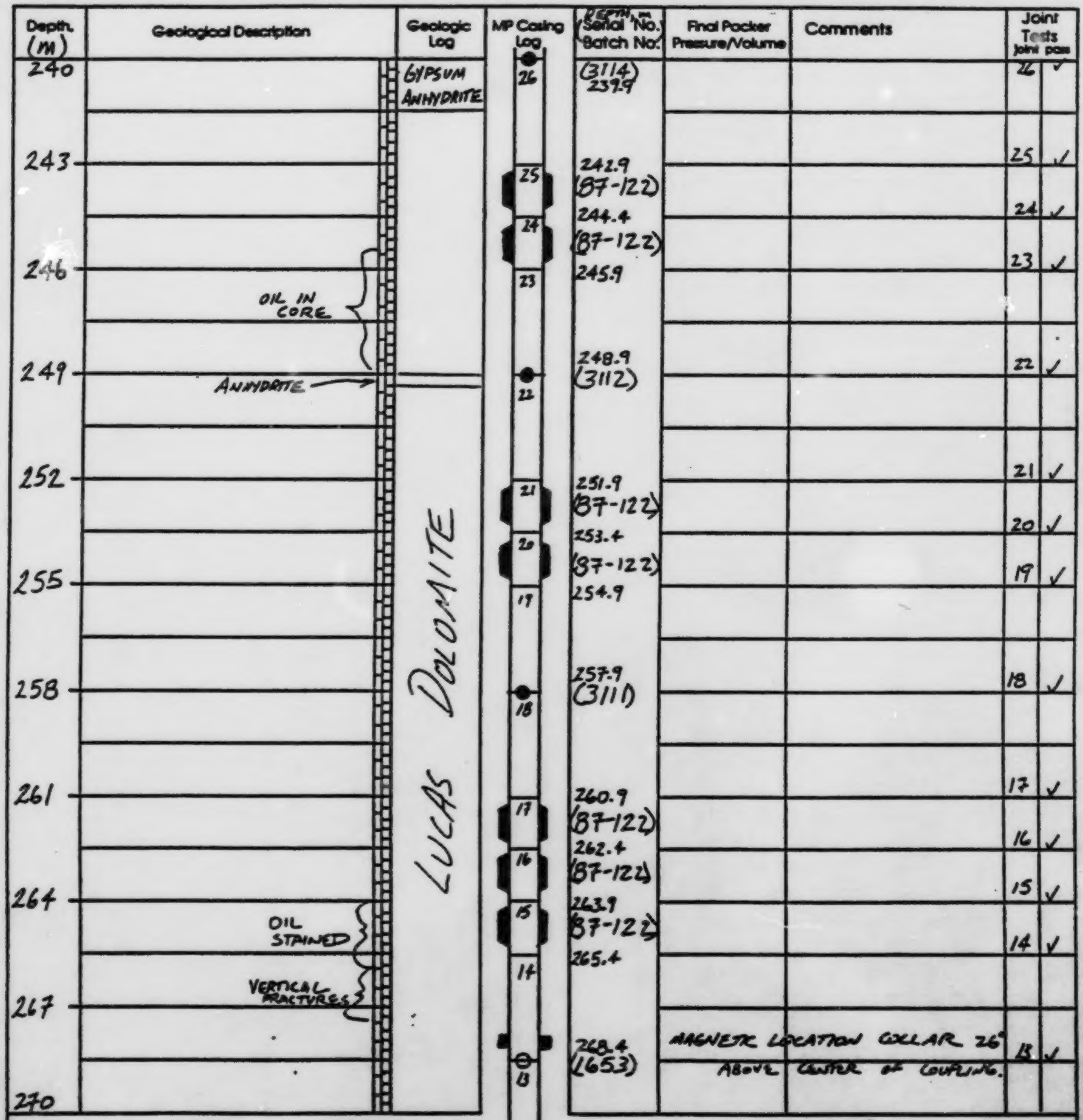
Regular MP Casing
MP Packer
Settlement Casing
Measurement Port Coupling
Pumping Port Coupling
Regular Coupling

221187

Sheet 9 of 10

MP System
Casing Installation Log

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-039)
WB Ref: WB538-87
Location: SARNIA, ONTARIO
Hole No: MDMW - 1
Installed by: R.S./A.S.
Hole Depth: 303 m
MP Depth: 300 m
Hole Diameter: HQ (4½")
Date Installed: Oct. 23-25/87
Measurement Datum: GROUND SURFACE
Datum Elevation:
Date Drawn:



Depth (m)	Geological Description	Geologic Log	MP Casing Log	Depth, m (Serial No.) Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	Joint Tests pass
240		GYPSUM ANHYDRITE	26 ●	(3114) 239.9			26	✓
243			25	242.9 (87-122)			25	✓
			24	244.4 (87-122)			24	✓
246	OIL IN CORE		23	245.9			23	✓
249	ANHYDRITE		22 ●	248.9 (3112)			22	✓
252		LUCAS DOLOMITE	21	251.9 (87-122)			21	✓
			20	253.4 (87-122)			20	✓
255			19	254.9			19	✓
258			18 ●	257.9 (3111)			18	✓
261			17	260.9 (87-122)			17	✓
			16	262.4 (87-122)			16	✓
264	OIL STAINED		15	263.9 (87-122)			15	✓
			14	265.4			14	✓
267	VERTICAL FRACTURES		13 ○	268.4 (1653)		MAGNETIC LOCATION COLLAR 26" ABOVE CENTER OF COUPLING.	13	✓
270								

Regular MP Casing
MP Packer
▨ Settlement Casing
● Measurement Port Coupling
○ Pumping Port Coupling
Regular Coupling

Sheet 10 of 10

MP System Casing Installation Log

Project: SARNIA (INTERA FOR MOE, INTERA No. H87-039) WB Ref: WB 538-87
Location: SARNIA, ONTARIO Hole No: MDMW - 1 Installed by: R.S./A.S.
Hole Depth: 303 m MP Depth: 300 m Hole Diameter: HQ (4½") Date Installed: OCT. 23-25/87
Measurement Datum: GROUND SURFACE Datum Elevation: Date Drawn:

Depth (m)	Geological Description	Geologic Log	MP Casing Log	Depth, m (Serial No.) Batch No.	Final Packer Pressure/Volume	Comments	Joint Tests joint	pass
270		SHALE						
			● 12	(3088) 271.4			12	✓
	VERTICAL FRACTURES							
273		LUCAS DOLOMITE					11	✓
			11	274.4 (87-122)				
276			10	275.9 (87-122)			10	✓
			9	277.4			9	✓
279								
			● 8	(3089) 280.4			8	✓ (100psig
282	OIL		7	283.4			7	✓ (230 ps
285	VERT. FRACTURES	AMHERSTBURG DOLOMITE - LIMESTONE						
			6	286.4 (87-122)			6	✓ (230psig)
288			5	287.9 (87-122)			5	✓ (230 ps
			4	289.4 (87-122)			4	✓ (240 psi
291	FOSSIL & MUD SEAMS		● 3	(3128) 290.9			3	✓ (238 psig
294			○ 2	(1658) 293.9		MAGNETIC LOCATION COLLAR 26" ABOVE CENTER OF COUPLING	2	✓ (230 psi
297			● 1	(3082) 296.9			1	✓ (230 ps
300					BOTTOM OF HOLE = 303 m			

Regular MP Casing | MP Packer | Settlement Casing | ● Measurement Port Coupling | ○ Pumping Port Coupling | Regular Coupling

CASING COMPLETION SUMMARY

Page 1 of 2

Site Location: SARNIA, ONTARIO (INTERA FOR MOE, INTERA No. H87-039)
Drillhole No.: MDMW-1
Weather/Temperature:
Installation Date: OCT. 23-25, 1987
Technician(s): R.S./A.S.
Job No./Client: WB 538-87/INTERA, MOE

Completion Zone	DEPTH Interval M	Length m	Piezometer		Pumping Port		Volume Pumped	Apparent "T"	Comments (Geology, etc.)
			#	Depth m	#	Depth m			
1	290.6-303.0	12.4	1	296.9	2	293.9			-DEPTH FROM GROUND SURFACE
			3	290.9					-ALL PUMPING PORT COUPLINGS HAVE
2	277.1-286.7	9.6	8	280.4					A MAGNETIC LOCATION COLLAR
3	265.1-274.7	9.6	12	271.4	13	268.4			INSTALLED ~26" ABOVE IT
4	254.6-261.2	6.6	18	257.9					-ALL PORTS PLASTIC UNLESS NOTED OTHERWISE
5	245.6-252.2	6.6	22	248.9					
6	233.6-243.2	9.6	26	239.9	27	236.9			
7	224.6-231.2	6.6	31	227.9					
8	215.6-222.2	6.6	35	218.9					
9	200.6-211.7	11.1	41	206.9	42	205.4			BOTH PORTS STAINLESS STEEL
			44	200.9					
10	185.6-196.7	11.1	49	191.4	50	190.4			BOTH PORTS STAINLESS STEEL
			52	185.9					
11	179.6-183.2	3.6	55	179.9					
12	167.6-177.2	9.6	58	173.9	59	170.9			
13	158.6-165.2	6.6	63	161.9					
14	148.1-156.2	8.1	68	152.9					STAINLESS STEEL
15	137.1-144.2	7.1	74	140.9					ALL JOINTS RE-INFORCED WITH STAINLESS
16	128.6-135.2	6.6	78	131.9					STEEL CLAMPS

CASING COMPLETION SUMMARY

Page 2 of 2

Site Location: SARNIA, ONTARIO (INTERA FOR MOE, INTERA No. H87-039)
Drillhole No.: MDMW-1
Weather/Temperature:

Installation Date: OCT. 23-25, 1987
Technician(s): R.S./A.S.
Job No./Client: W8538-87/INTERA, MOE

Completion Zone	DEPTH Interval m	Length m	Piezometer		Pumping Port		Volume Pumped	Apparent "T"	Comments (Geology, etc.)
			#	Depth m	#	Depth m			
17	116.6 -126.2	9.6	82	122.9	83	119.9			↑
18	109.1-114.2	5.1	87	110.9					
19	100.1-106.7	6.6	91	103.4					ALL JOINTS REINFORCED WITH STAINLESS STEEL CLAMPS
20	88.1 -97.7	9.6	96	91.4					
21	82.1 - 85.7	3.6	100	82.4					
22	70.1 - 79.7	9.6	104	74.9	105	73.4			↓ STAINLESS STEEL MEASUREMENT PORT
23	58.1 -66.2	8.1	111	61.4					
24	49.1- 55.7	6.6	115	52.4					
25	38.6-45.2	6.6	120	41.9					
26	17.6-36.2	18.6	126	26.9					INSIDE HW CASING (4" I.D.)

APPENDIX I

Hydraulic Test Results
Borehole MDMW-1

APPENDIX I1

Summary of Analyses and Results
Hydraulic Testing
Borehole MDMW-1

HYDRAULIC TEST ANALYSES - DEEP BOREHOLE

i) Constant Pressure Injection/Withdrawal Tests

The measured flow rates and injection/withdrawal heads of the drill stem tests, straddle packer injection tests, and casing withdrawal tests were expressed as hydraulic conductivity assuming steady radial confined flow using the relation (Hvorslev, 1951):

$$K = \frac{Q}{\Delta H 2 \pi L} \ln (r_b/r_w) \qquad (1)$$

where: Q = steady volumetric flow rate (L^3/T);
ΔH = steady injection/withdrawal head (L);
L = test interval length (L);
r_b = radius to constant pressure boundary assumed equal to 10 m
r_w = radius of borehole equal to 0.048 m.

Table I1-1 summarizes the test data and calculated hydraulic conductivities from the drill stem tests. Several results are expressed as less than some value because no measurable flow was recorded during the tests.

Table I1-2 summarizes the test data and calculated hydraulic conductivities from the straddle packer injection tests.

The test data and calculated hydraulic conductivities of the casing withdrawal tests are given in Table I1-3. In this table several results are expressed as greater than a specified value due to uncertainty in withdrawal head measurement due to frictional head losses through the measurement port and sampler probe.

ii) Pulse Tests

Straddle packer pulse tests including packer pulse tests both in the test interval and below the probe and piston pulse tests were analyzed using the type curve method of Bredehoeft and Papadopulos (1980).

The type curve analytical method involves plotting in normalized form, the decay of a pressure pulse against log time and the fitting of the normalized decay curve to a type curve characterized by an α value to obtain curve model parameters of t and β. The hydraulic conductivity is determined from the match point values and the properties of the fluid and characteristics of the test interval using (Bredehoeft and Papadopulos, 1980):

$$K = \frac{\beta V C \rho g}{\pi t L} \qquad (2)$$

where:
K = hydraulic conductivity (L/T);
β = dimensionless curve match parameter;
V = test interval fluid volume (L^3);
C = test interval compressibility (LT^2/M);
ρ = fluid density (M/L^3);
g = gravitational acceleration (L/T^2);
t = curve match parameter (T);
L = test interval length (L).

The test interval compressibility is a measure of changing volume, changing pressure characteristics of the test interval and includes the total system compressibility due to the compressibility of the test interval fluid and of compliant test equipment, such as inflatable packers, flexible tubing and "O" ring seals. The compressibility is defined as:

$$C = \frac{\Delta V}{V \Delta P} \qquad (3)$$

where: C = test interval compressibility (LT^2/M);
ΔV = change in fluid volume (L^3);
ΔP = change in fluid pressure ($M/L \cdot T^2$).

The storage coefficient (storativity) of the formation can also be approximately determined from the type curve method using the α value of the type curve and characteristics of the test interval using:

$$S = \frac{\alpha V C \rho g}{\pi r_w^2} \qquad (4)$$

where: α = dimensionless type curve parameter;
S = dimensionless storage coefficient for tested interval;
r_w = radius of wellbore equal to 0.048 m.

Estimates of storativity determined using equation (4) are, at best, only order of magnitude accurate.

Piston pulse tests were analyzed using equation (2) with fresh water fluid properties and an interval compressibility C determined from the measured displacement volume of the piston (3 mL), observed pressure pulse magnitude and calculated test interval volume. The test data of these tests and the calculated hydraulic conductivities and storativities are given in Table I1-4. Plots of normalized pulse decay and best visually fit type curves of these tests are given in Appendix I2. During several of these tests instantaneous decay of the pulse occurred or no pulse was measured and only an estimate of hydraulic conductivity as being greater than 1×10^{-8} m/s can be reported.

Packer pulse tests were analyzed using a compressibility C of 2×10^{-9} Pa^{-1} m/s. This value is slightly more compressible than ordinary water at 10°C and was determined from comparison of packer pulse tests to piston pulse and injection tests performed on the same interval (i.e., Tests MD138 and 146 performed at 288.10-293.32 m depth, Tests MD124 at 218.10-223.32 m depth, etc.). The test data and calculated hydraulic conductivities of the P2 packer pulse tests are given in Table I1-5. The plots and type curve analyses of these tests are given in Appendix I3. In several of these tests a very rapid decay of the inflation pulse was measured and hydraulic conductivities can only be reported as greater than 1 x 10^{-9} m/s. The test data and calculated hydraulic conductivities of the below probe and (P1) packer pulse tests are given in Table I1-6. The plots and type curve analyses of these tests are given in Appendix I4. Because of packer creep the decay of the pulse in the packer pulse test is artificially prolonged and the estimated hydraulic is considered a minimum value.

TABLE I1-1

SUMMARY OF DRILL STEM TEST RESULTS
BOREHOLE MDMW-1 SARNIA, ONTARIO

TEST #	INTERVAL TOP (mBGS)	INTERVAL BOT (mBGS)	INTERVAL LENGTH (m)	FLOWRATE Q (m3/sec)	INJ.HEAD dH (m)	Q/dH (m2/sec)	HYDRAULIC COND. (m/sec)
DST-1	50.60	59.20	8.60	< 4.2E-07	21.0	< 2.0E-08	< 2.0E-09
DST-2	81.10	89.60	8.50	< 3.1E-07	19.7	< 1.6E-08	< 1.6E-09
DST-3	102.40	110.90	8.50	< 4.2E-07	17.6	< 2.4E-08	< 2.4E-09
DST-4*	120.70	135.40	14.70	4.3E-06	64.0	6.7E-08	3.9E-09
DST-5	143.24	165.91	22.67	< 6.5E-08	30.0	< 2.2E-09	< 8.1E-11
DST-6	181.06	196.30	15.24	1.1E-05	40.0	2.8E-07	1.5E-08
DST-7	202.40	226.80	24.40	2.5E-05	40.8	6.1E-07	2.1E-08
DST-8	229.80	254.20	24.40	2.7E-06	5.4	5.0E-07	1.7E-08
DST-9	247.50	260.30	12.80	GEOCHEMICAL SAMPLING			
DST-10	270.40	284.00	13.60	3.1E-05	40.2	7.7E-07	4.8E-08

* WITHDRAWAL TEST

TABLE I1-2

SUMMARY OF INJECTION TEST RESULTS
BOREHOLE MDMW-1 SARNIA, ONTARIO

TEST #	INTERVAL TOP (mBGS)	INTERVAL BOT (mBGS)	INTERVAL LENGTH (m)	TANK DIAMETER (mm)	TANK FLOW (cm/min)	PRESSURE HEAD (mv)	FLOWRATE Q (m3/sec)	INJ.HEAD dH (m)	Q/dH (m2/sec)	HYDRAULIC COND. (m/sec)
MD140	183.10	188.32	5.22	51.0	6.50	12.2	2.21E-06	23.84	9.28E-08	1.51E-08
41	188.10	193.32	5.22	51.0	15.00	6.4	5.11E-06	12.51	4.08E-07	6.65E-08
42	206.10	211.32	5.22	51.0	9.00	10.5	3.06E-06	20.52	1.49E-07	2.43E-08
43	238.10	243.32	5.22	51.0	2.50	10.6	8.51E-07	20.71	4.11E-08	6.69E-09
44	268.10	273.32	5.22	51.0	24.00	4.9	8.17E-06	9.58	8.53E-07	1.39E-07
45	273.10	278.32	5.22	51.0	13.00	3.4	4.43E-06	6.59	6.72E-07	1.09E-07
46	288.10	293.32	5.22	51.0	6.00	21.9	2.04E-06	42.79	4.77E-08	7.77E-09
47	123.10	128.32	5.22		SHUT IN TEST ONLY					
48	74.60	79.82	5.22		SHUT IN TEST ONLY					

TABLE I1-3

SUMMARY OF "WESTBAY" CASING WITHDRAWAL TEST RESULTS
BOREHOLE MDMW-1 SARNIA, ONTARIO

TEST #	INTERVAL TOP (mBGS)	INTERVAL BOT (mBGS)	INTERVAL LENGTH (m)	FLOWRATE Q (m3/sec)	WITHDRAWAL HEAD (m)	Q/dH (m2/sec)	HYDRAULIC COND. (m/sec)
WCT-1	58.20	66.10	7.90	7.0E-08	36.0	1.9E-09	2.1E-10
WCT-2	70.20	79.60	9.40	2.3E-06 <	14.8 >	1.6E-07 >	1.4E-08
WCT-3	167.70	177.10	9.40	9.5E-08	13.4	7.1E-09	6.4E-10
WCT-4	233.70	243.10	9.40	7.0E-07	18.8	3.7E-08	3.4E-09
WCT-5	265.20	274.60	9.40	3.2E-06 <	10.2 >	3.1E-07 >	2.8E-08
WCT-6	290.70	303.00	12.30	6.9E-08	12.7	5.4E-09	3.8E-10

TABLE I1-4

SUMMARY OF STRADDLE PACKER TEST RESULTS   PISTON PULSE RESPONSE (P2)
BOREHOLE MDMW-1   SARNIA, ONTARIO

						CURVE	MATCH			
TEST NUMBER	INTERVAL TOP (mBGS)	INTERVAL BOT (mBGS)	INTERVAL LENGTH (m)	PULSE MAG (mv)	PULSE MAG (m)	ALPHA	t for beta=1 (min)	HYDRAULIC CONDUCT (m/s)	STORATIVITY	COMMENTS
MD105	148.10	153.32	5.22	4.29	8.38	1.0E-01	70.00	5.20E-12	1.55E-05	
6	153.10	158.32	5.22	3.85	7.52	1.0E-02	21.00	1.93E-11	1.72E-06	
7	158.10	163.32	5.22	3.56	6.96	1.0E-01	380.00	1.15E-12	1.86E-05	
8	163.10	168.32	5.22	3.04	5.94	1.0E-03	12.00	4.28E-11	2.18E-07	
9	168.10	173.32	5.22	0.59	1.15	1.0E-01	205.00	1.29E-11	1.12E-04	
10	173.10	178.32	5.22	1.64	3.20	1.0E-02	1.20	7.93E-10	4.04E-06	
11	178.10	183.32	5.22	1.13	2.21	1.0E-02	1.40	9.86E-10	5.87E-06	
12	183.10	188.32	5.22	0.00	0.00			NA	NA	PISTON STICKING
13	188.10	193.32	5.22	0.00	0.00			NA	NA	PISTON STICKING
14	193.10	198.32	5.22	0.00	0.00			NA	NA	PISTON STICKING
15	178.10	183.32	5.22	0.00	0.00			NA	NA	PISTON STICKING
16	178.10	183.32	5.22	2.64	5.16	1.0E-02	0.90	6.57E-10	2.51E-06	
17	183.10	188.32	5.22	0.84	1.64	NM	NM	> 1.00E-08 *	NA	INST.DECAY
18	188.10	193.32	5.22	0.22	0.43	NM	NM	> 1.00E-08 *	NA	INST.DECAY
19	193.10	198.32	5.22	0.00	0.00			> 1.00E-08 *	NA	NO PULSE
20	198.10	203.32	5.22	0.33	0.64	NM	NM	> 1.00E-08 *	NA	INST.DECAY
21	203.10	208.32	5.22	0.00	0.00			> 1.00E-08 *	NA	NO PULSE
22	208.10	213.32	5.22	0.74	1.45	NM	NM	> 1.00E-08 *	NA	INST.DECAY
23	213.10	218.32	5.22	0.09	0.18	NM	NM	> 2.00E-09 *	NA	MIN. PULSE
24	218.10	223.32	5.22	2.83	5.53	1.0E-02	0.30	1.84E-09	2.34E-06	
25	223.10	228.32	5.22	2.79	5.45	1.0E-02	0.33	1.69E-09	2.38E-06	
26	228.10	233.32	5.22	0.16	0.31	NM	NM	> 1.00E-08 *	NA	INST.DECAY
27	233.10	238.32	5.22	1.08	2.11	5.0E-01	0.13	1.11E-08	3.07E-04	
28	238.10	243.32	5.22	3.05	5.96	1.0E-01	0.42	1.22E-09	2.17E-05	
37	283.10	288.32	5.22	1.98	3.87	1.0E-01	1.00	7.88E-10	3.35E-05	
38	288.10	293.32	5.22	2.33	4.55	1.0E-01	0.71	9.43E-10	2.85E-05	
39	293.10	298.32	5.22	2.88	5.63	1.0E-02	6.00	9.03E-11	2.30E-06	

NM - NO MATCH
NA - NOT APPLICABLE
* - ESTIMATE BASED ON STRIP CHART RESPONSE

TABLE I1-5

SUMMARY OF STRADDLE PACKER TEST RESULTS   PACKER PULSE RESPONSE (P2)
BOREHOLE MDMW-1   SARNIA, ONTARIO

TEST NUMBER	INTERVAL TOP (mBGS)	INTERVAL BOT (mBGS)	INTERVAL LENGTH (m)	PULSE MAG (mv)	PULSE MAG (m)	CURVE ALPHA	MATCH t for beta=1 (min)	HYDRAULIC CONDUCT (m/s)	STORATIVITY	COMMENTS
MD122	208.10	213.32	5.22	19.45	38.01	NM	NM >	1.00E-09		MIN. PULSE
23	213.10	218.32	5.22	7.70	15.05	NM	NM >	1.00E-09		MIN. PULSE
24	218.10	223.32	5.22	32.66	63.82	1.0E-03	0.50 >	1.38E-09 >	9.37E-08	
25	223.10	228.32	5.22	32.64	63.78	1.0E-02	1.80 >	3.83E-10 >	9.37E-07	
26	228.10	233.32	5.22	7.91	15.46	NM	NM >	1.00E-09		MIN. PULSE
27	233.10	238.32	5.22	15.75	30.78	1.0E-01	0.31 >	2.22E-09 >	9.37E-06	
28	238.10	243.32	5.22	30.78	60.15	1.0E-03	0.95 >	7.25E-10 >	9.37E-08	
29	243.10	248.32	5.22	12.98	25.36	1.0E-02	2.00 >	3.45E-10 >	9.37E-07	
30	248.10	253.32	5.22	20.91	40.86	1.0E-02	0.70 >	9.85E-10 >	9.37E-07	
31	253.10	258.32	5.22	12.94	25.29	NM	NM >	1.00E-09		MIN. PULSE
32	258.10	263.32	5.22	14.38	28.10	NM	NM >	1.00E-09		MIN. PULSE
33	263.10	268.32	5.22	8.30	16.22	NM	NM >	1.00E-09		MIN. PULSE
34	268.10	273.32	5.22	4.09	7.99	NM	NM >	1.00E-09		MIN. PULSE
35	273.10	278.32	5.22	3.53	6.90	NM	NM >	1.00E-09		MIN. PULSE
36	278.10	283.32	5.22	26.77	52.31	1.0E-03	0.40 >	1.72E-09 >	9.37E-08	
37	283.10	288.32	5.22	31.32	61.20	1.0E-03	1.30 >	5.30E-10 >	9.37E-08	
38	288.10	293.32	5.22	29.70	58.04	1.0E-02	2.00 >	3.45E-10 >	9.37E-07	
39	293.10	298.32	5.22	26.70	52.17	1.0E-02	6.30 >	1.09E-10 >	9.37E-07	

NM - NO MATCH
NA - NOT APPLICABLE

TABLE I1-6

SUMMARY OF STRADDLE PACKER TEST RESULTS   BELOW PROBE PULSE RESPONSE (P1)
BOREHOLE MDMW-1   SARNIA, ONTARIO

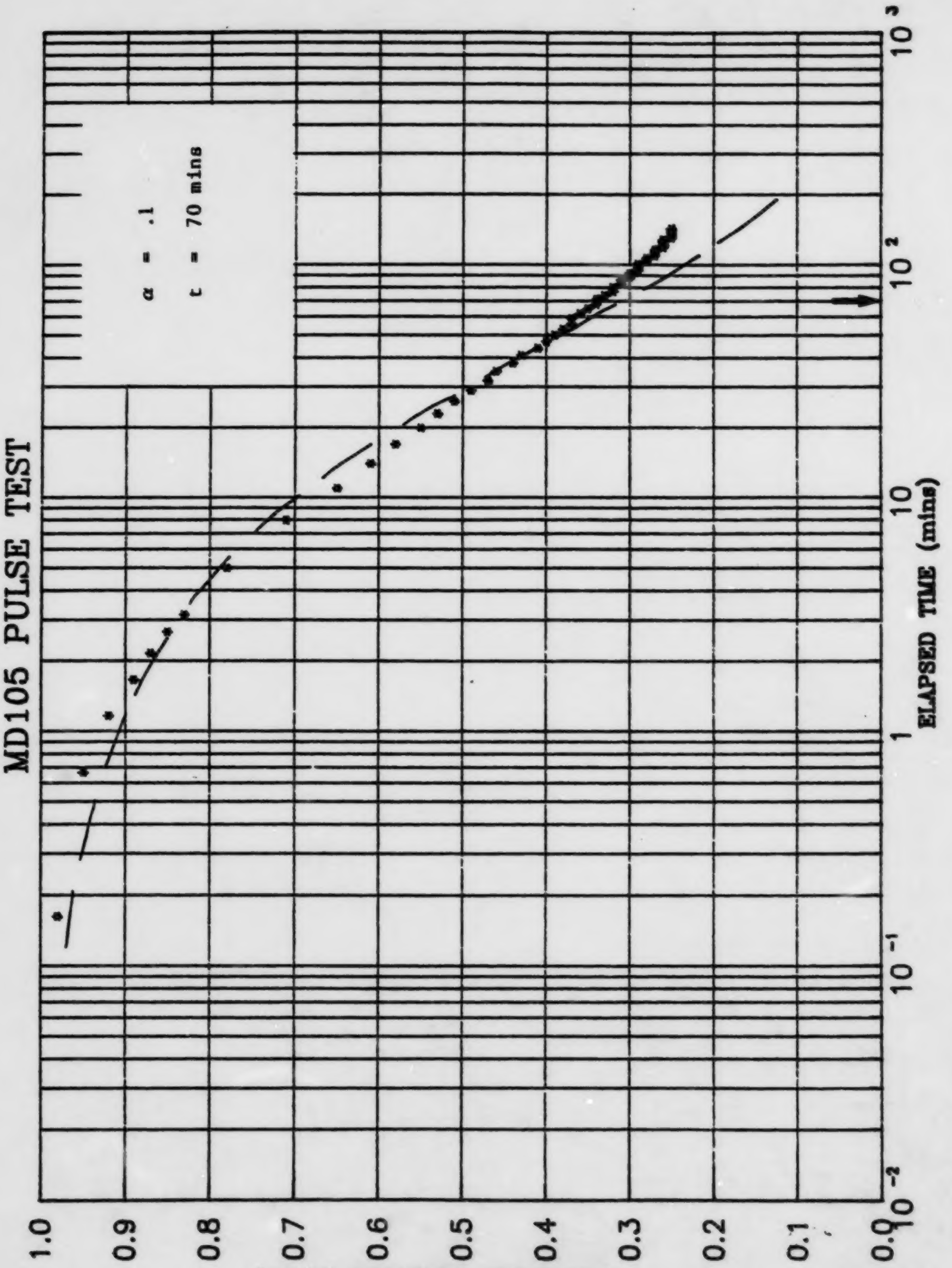
TEST NUMBER	INTERVAL TOP (mBGS)	INTERVAL BOT (mBGS)	INTERVAL LENGTH (m)	PULSE MAG (mv)	PULSE MAG (m)	CURVE ALPHA	MATCH t for beta=1 (min)	HYDRAULIC CONDUCT (m/s)	STORATIVITY
MD134	273.95	303.56	29.61	2.11	4.12	NM	NM	NA	NA
35	278.95	303.56	24.61	5.01	9.79	1.0E-02	0.85 >	8.11E-10	4.42E-06
36	283.95	303.56	19.61	7.35	14.36	1.0E-02	0.42 >	1.64E-09	3.52E-06
37	288.95	303.56	14.61	13.66	26.69	1.0E-02	0.67 >	1.03E-09	2.62E-06
38	293.95	303.56	9.61	21.59	42.19	1.0E-01	2.80 >	2.46E-10	1.73E-05
39	298.95	303.56	4.61	27.81	54.34	1.0E-01	12.00 >	5.75E-11	8.28E-06

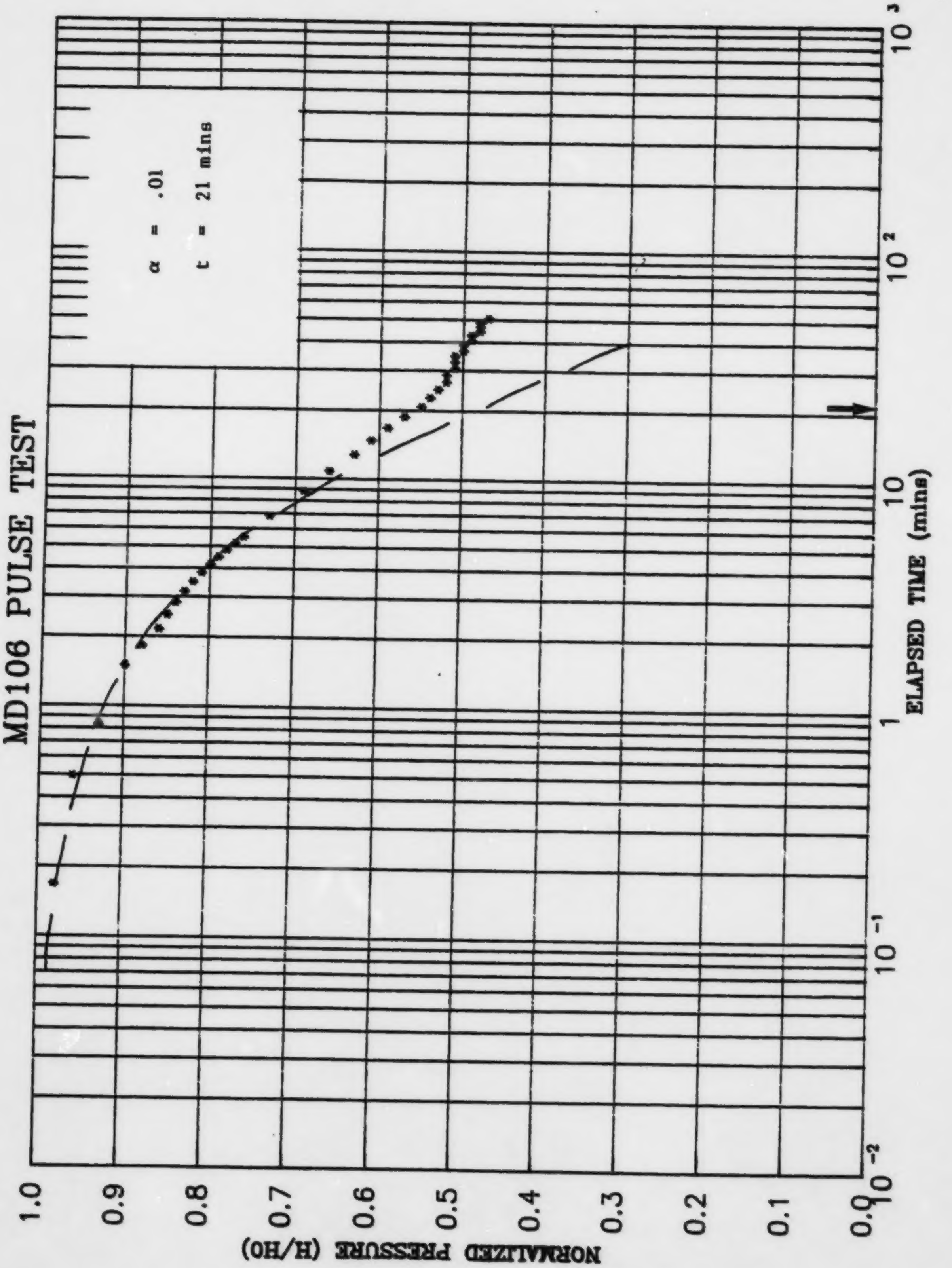
NM - NO MATCH
NA - NOT APPLICABLE

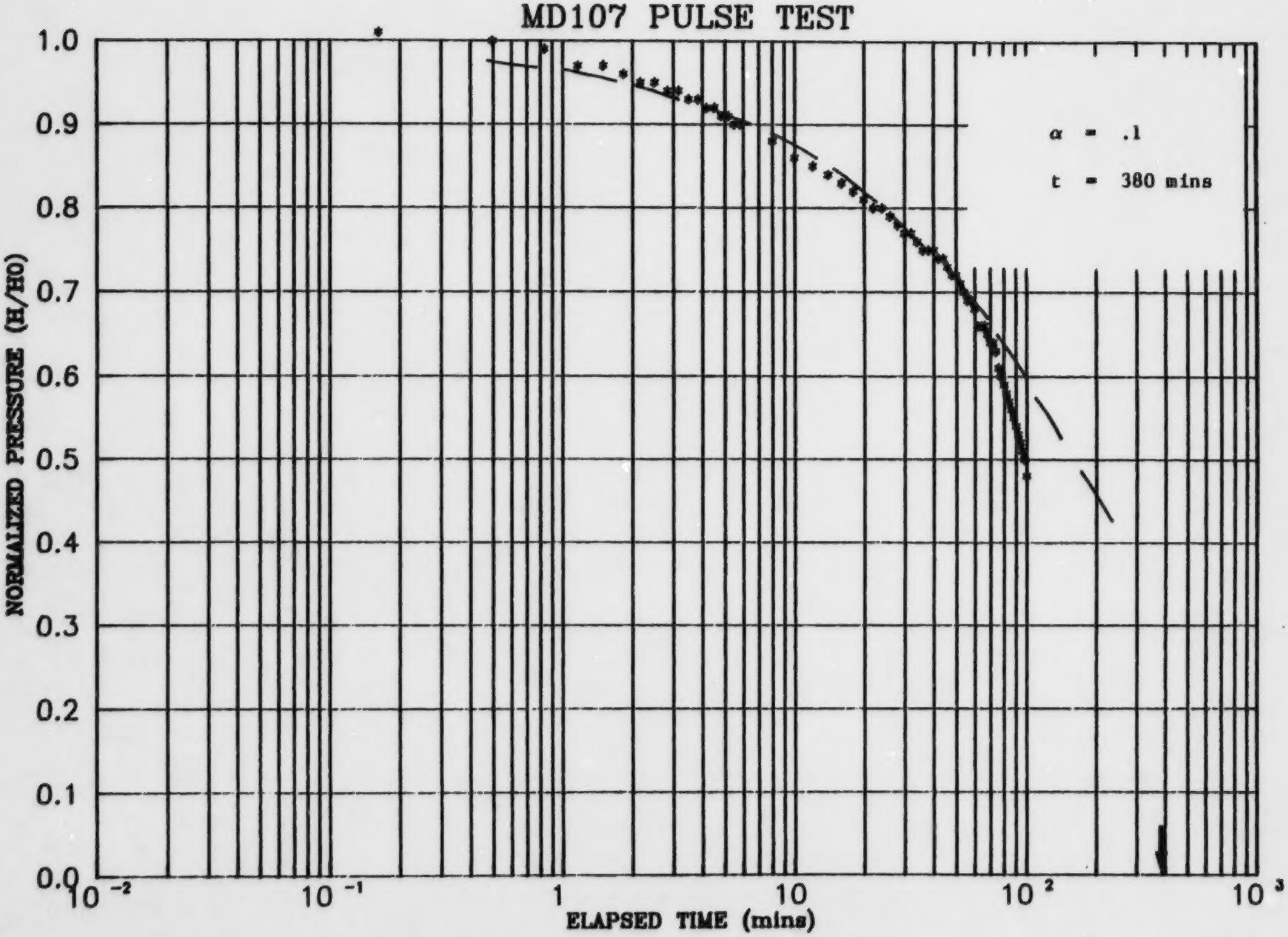
APPENDIX I2

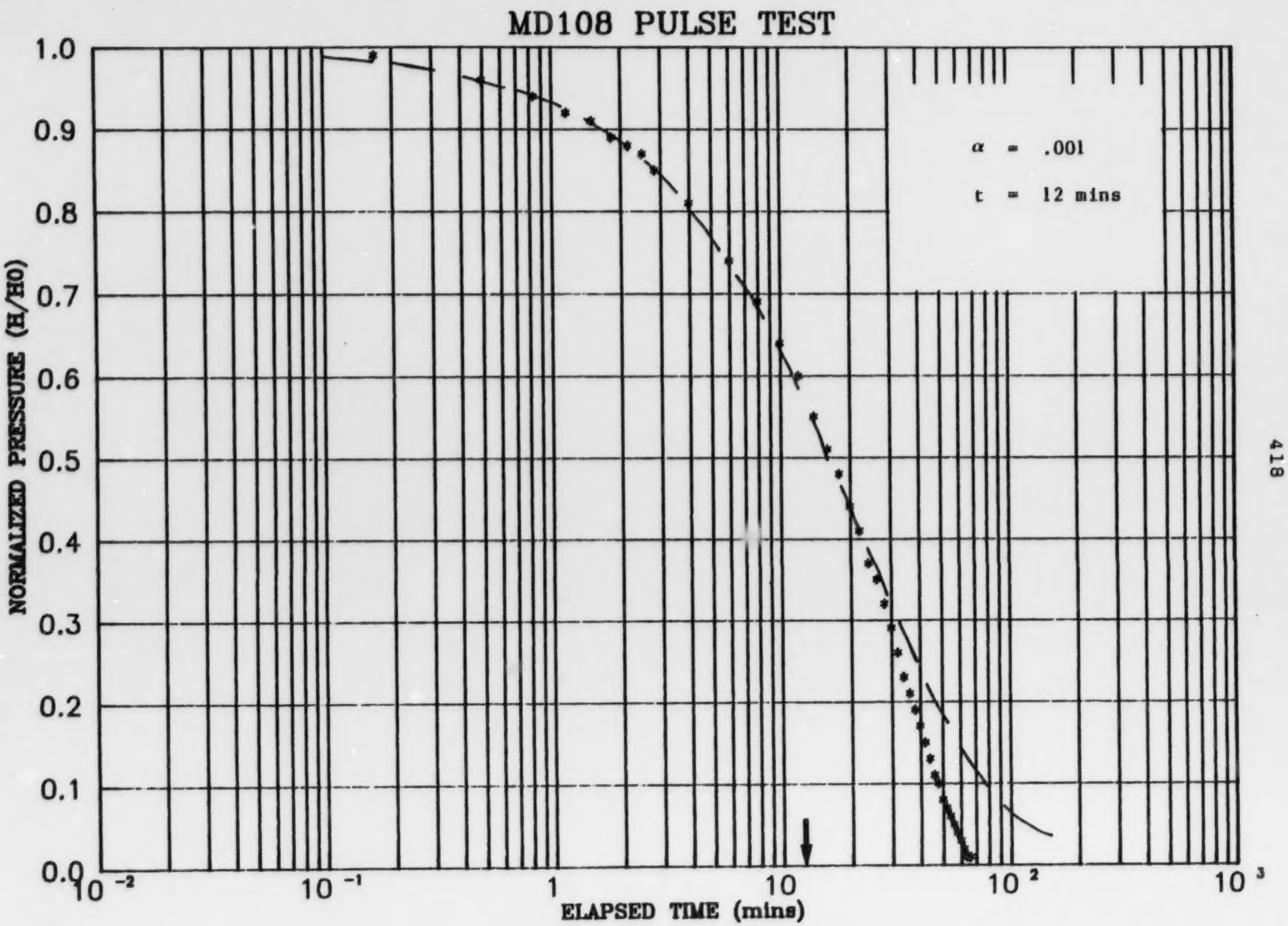
Data Plots and Type Curve Analyses Piston Pulse Tests

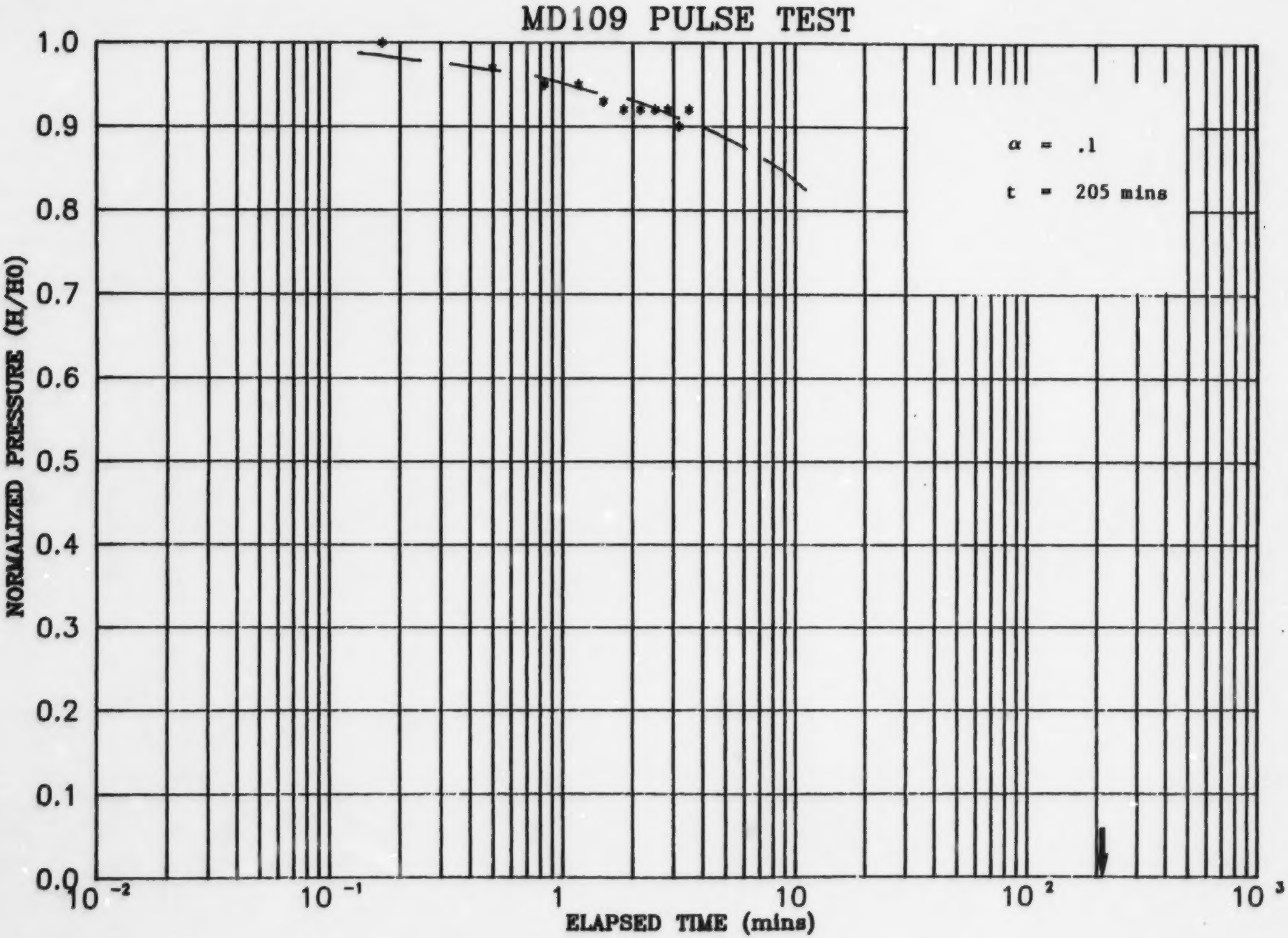
Borehole MDMW-1

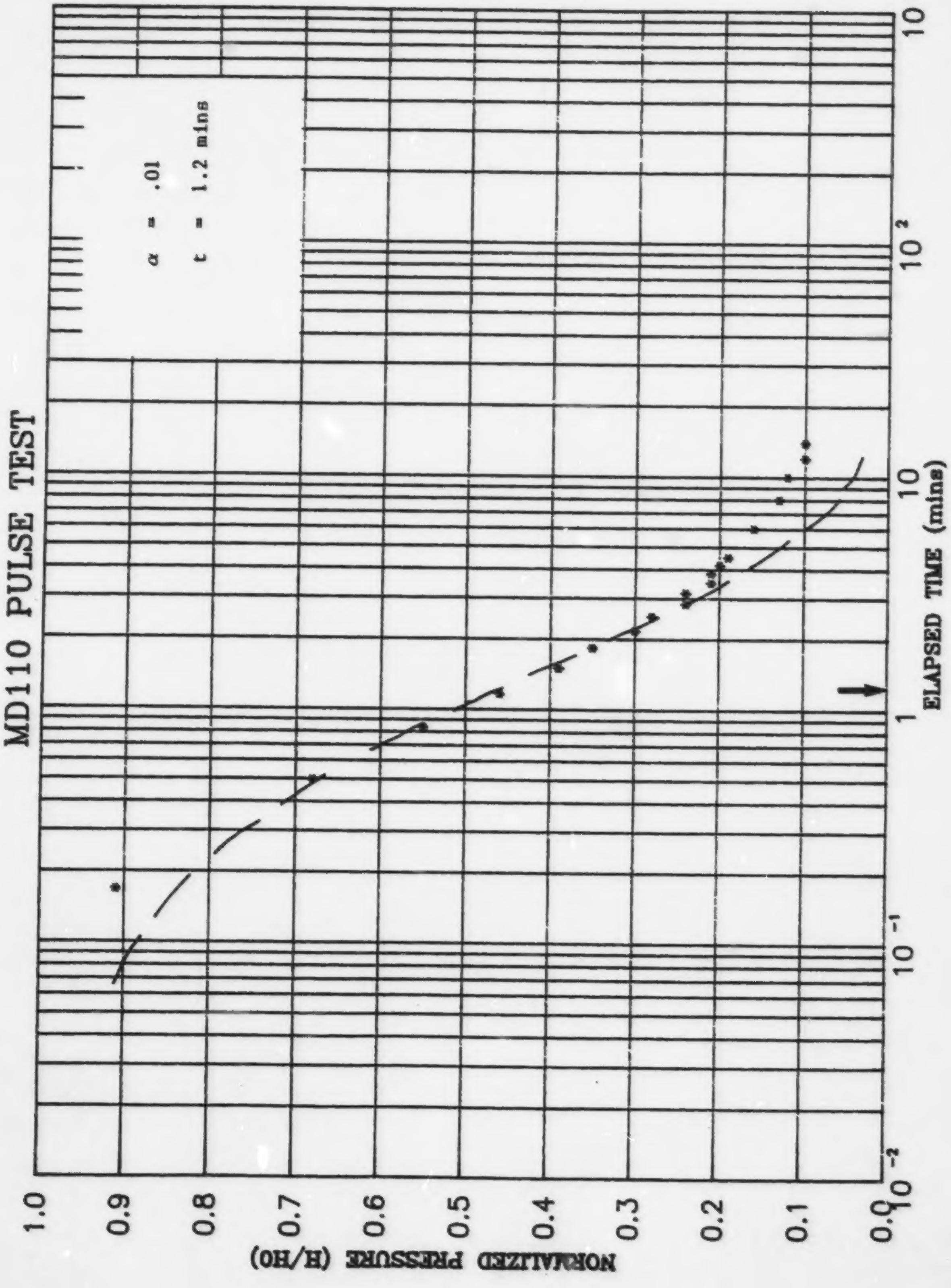

MD105 PULSE TEST
α = .1
t = 70 mins
NORMALIZED PRESSURE (H/H0)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (mins)
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}

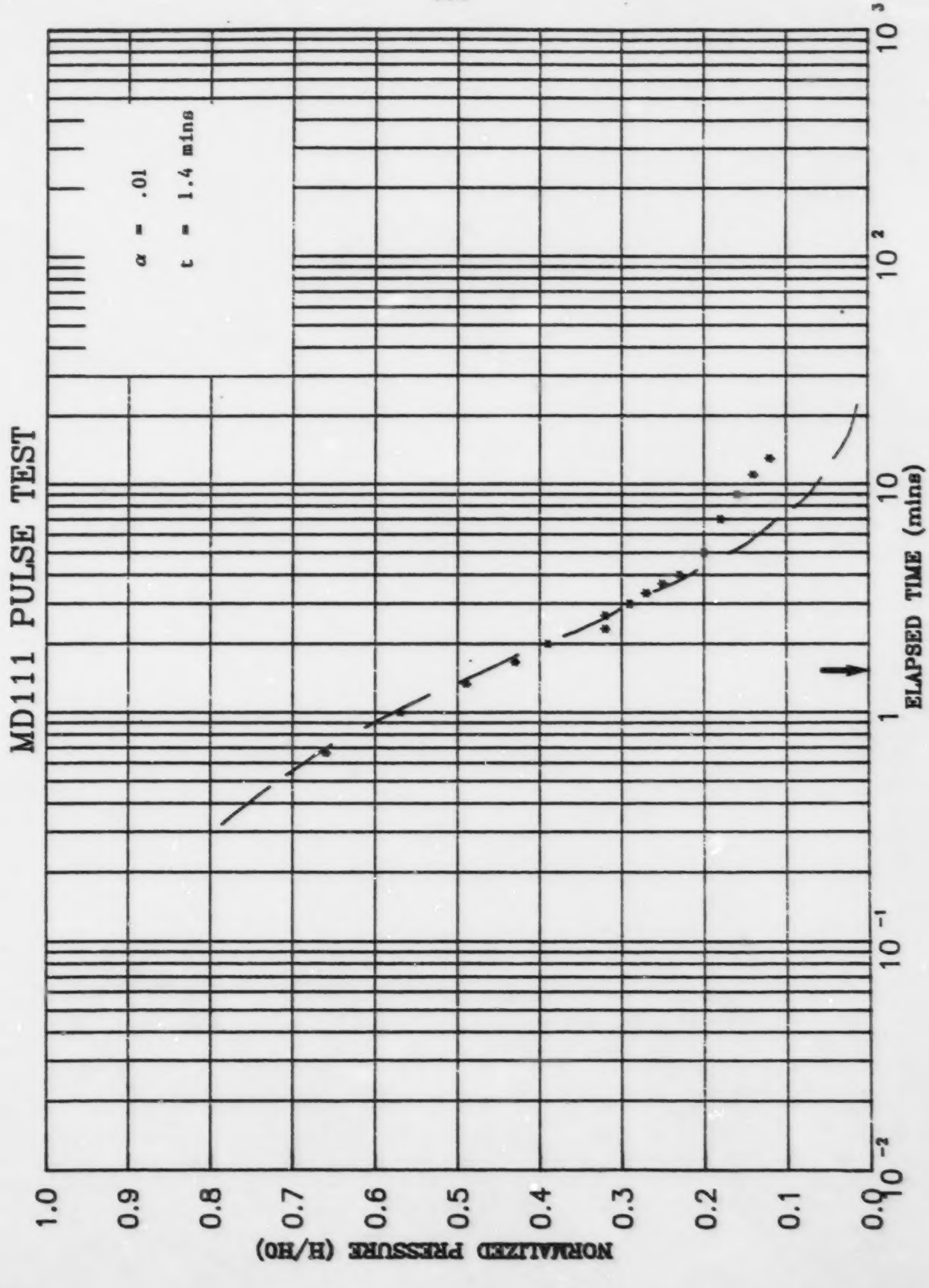

MD106 PULSE TEST
α = .01
t = 21 mins
NORMALIZED PRESSURE (H/H0)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (mins)
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}


MD107 PULSE TEST
NORMALIZED PRESSURE (H/HO)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}
ELAPSED TIME (mins)
α = .1
t = 380 mins

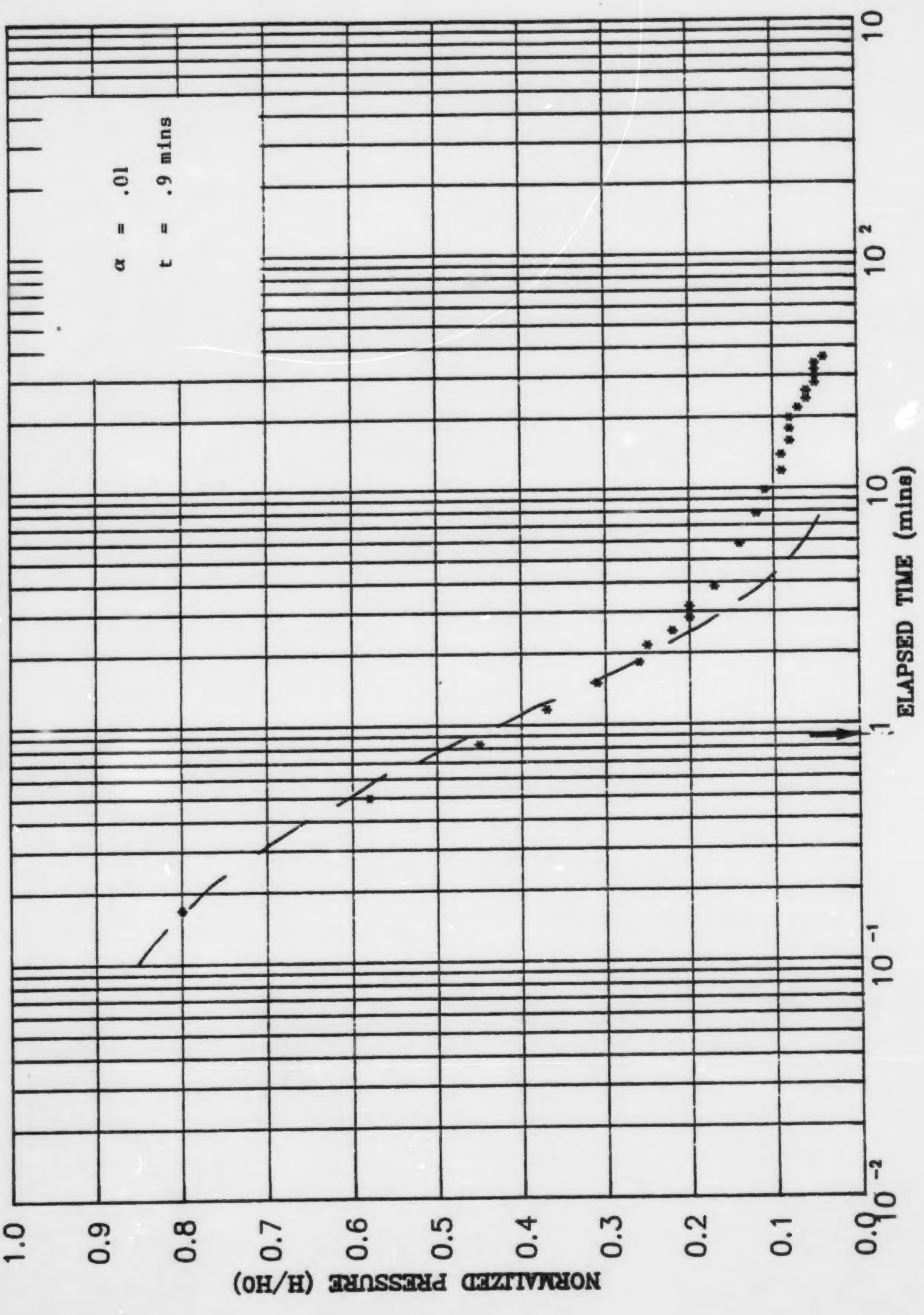

MD108 PULSE TEST


MD109 PULSE TEST
NORMALIZED PRESSURE (H/H0)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}
ELAPSED TIME (mins)
α = .1
t = 205 mins

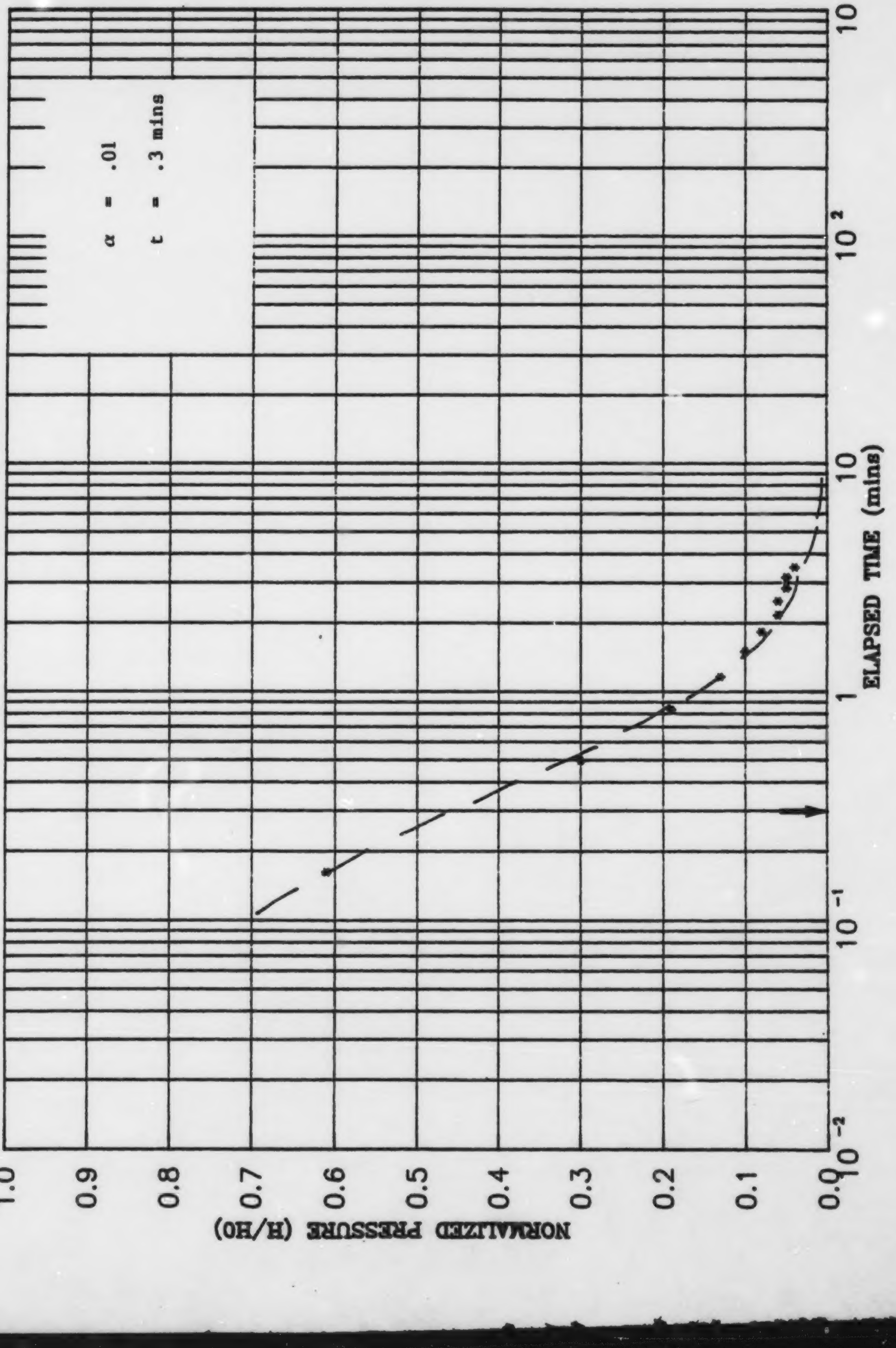

MD110 PULSE TEST
α = .01
t = 1.2 mins
NORMALIZED PRESSURE (H/HO)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (mins)
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}


MD111 PULSE TEST
α = .01
t = 1.4 mins
NORMALIZED PRESSURE (H/HO)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (mins)
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}

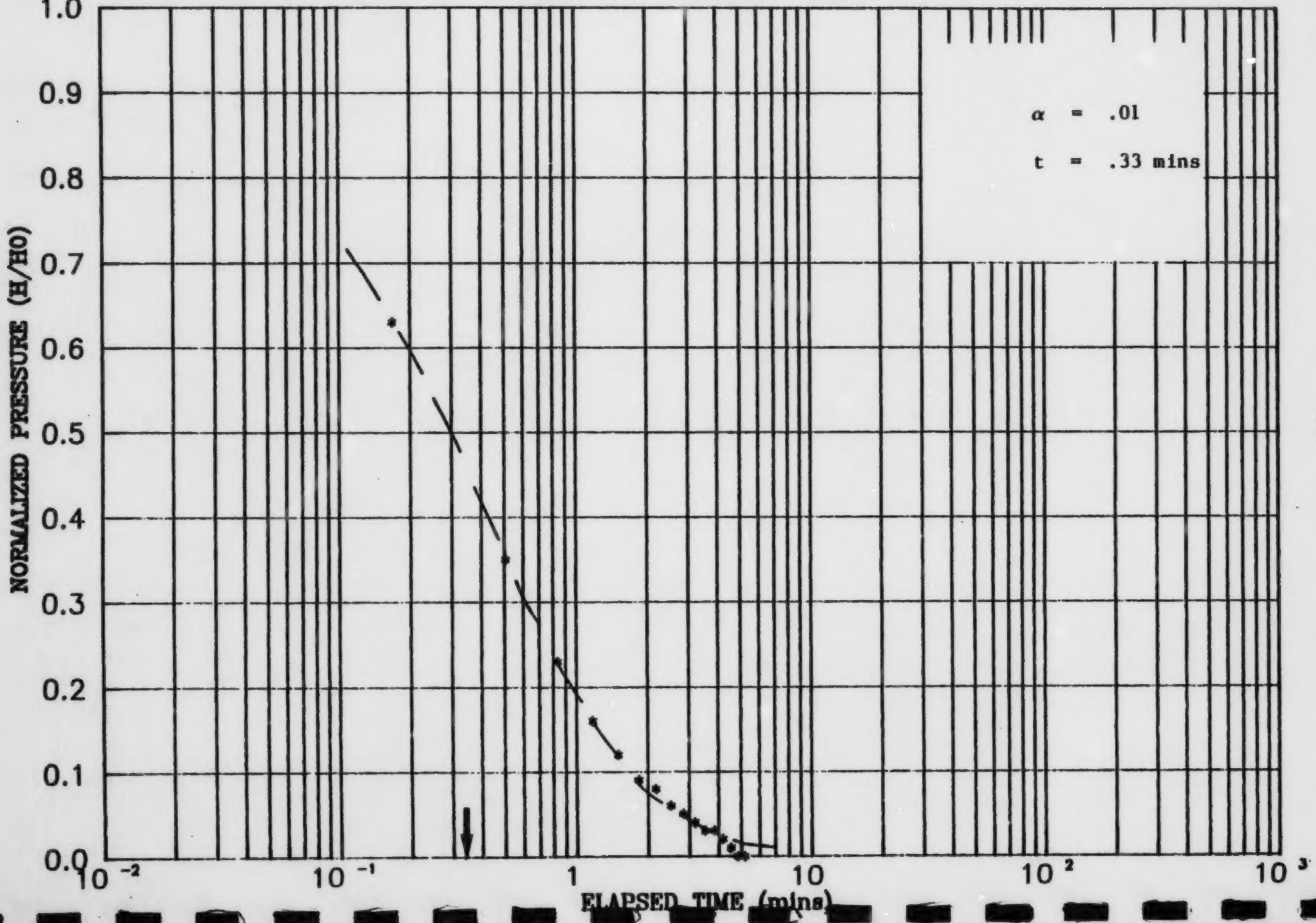
MD116 PULSE TEST

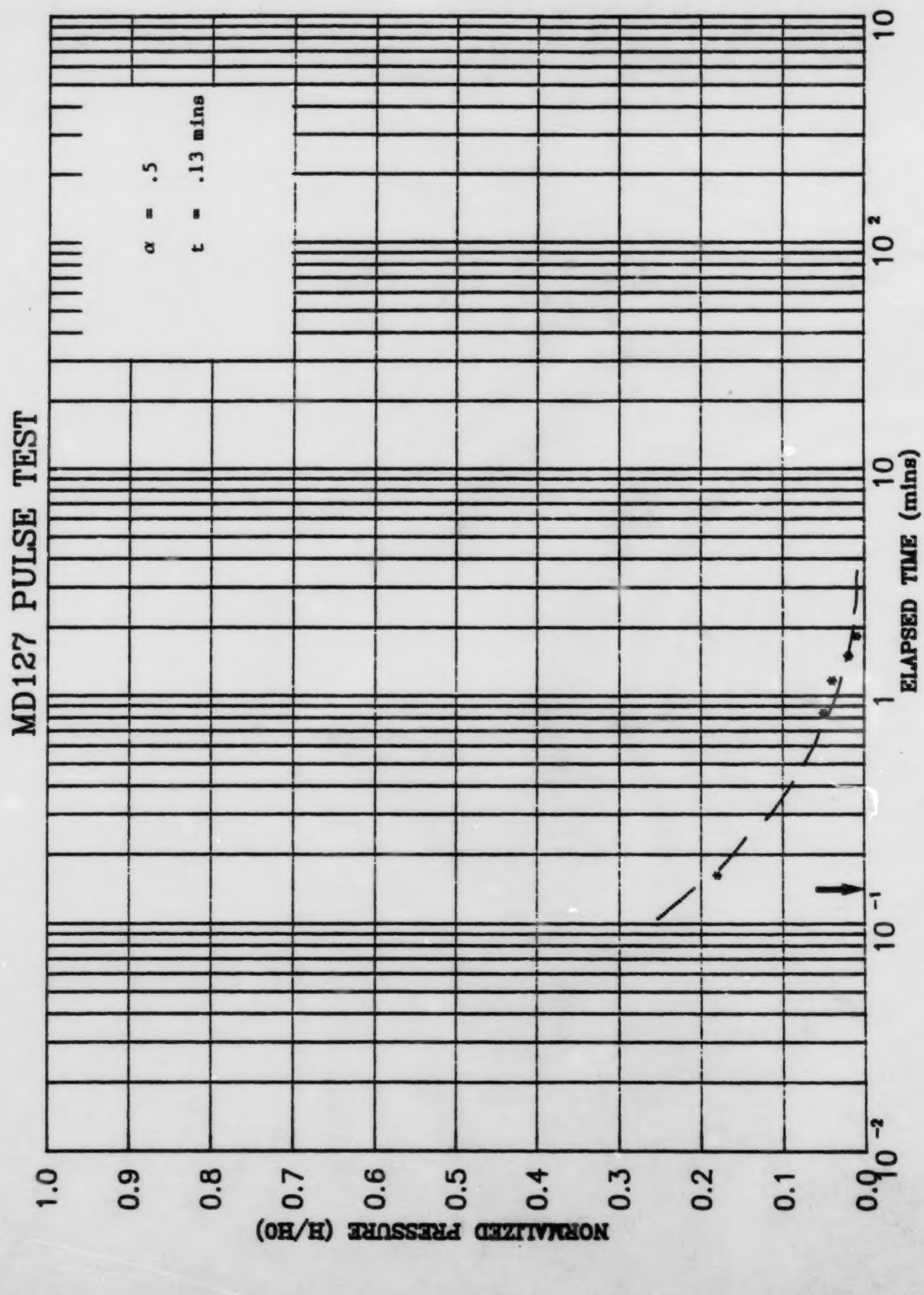


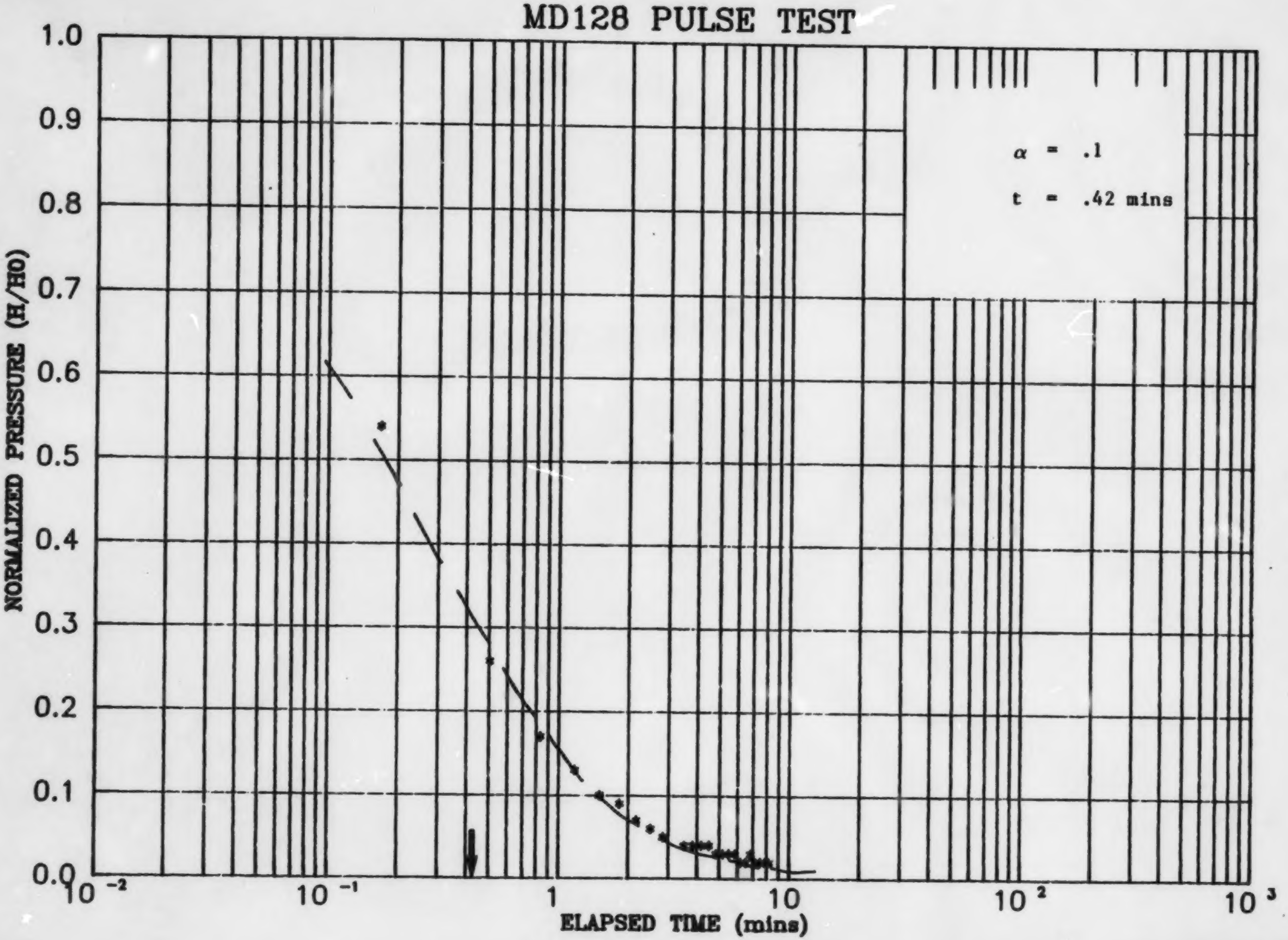
MD124 PULSE TEST

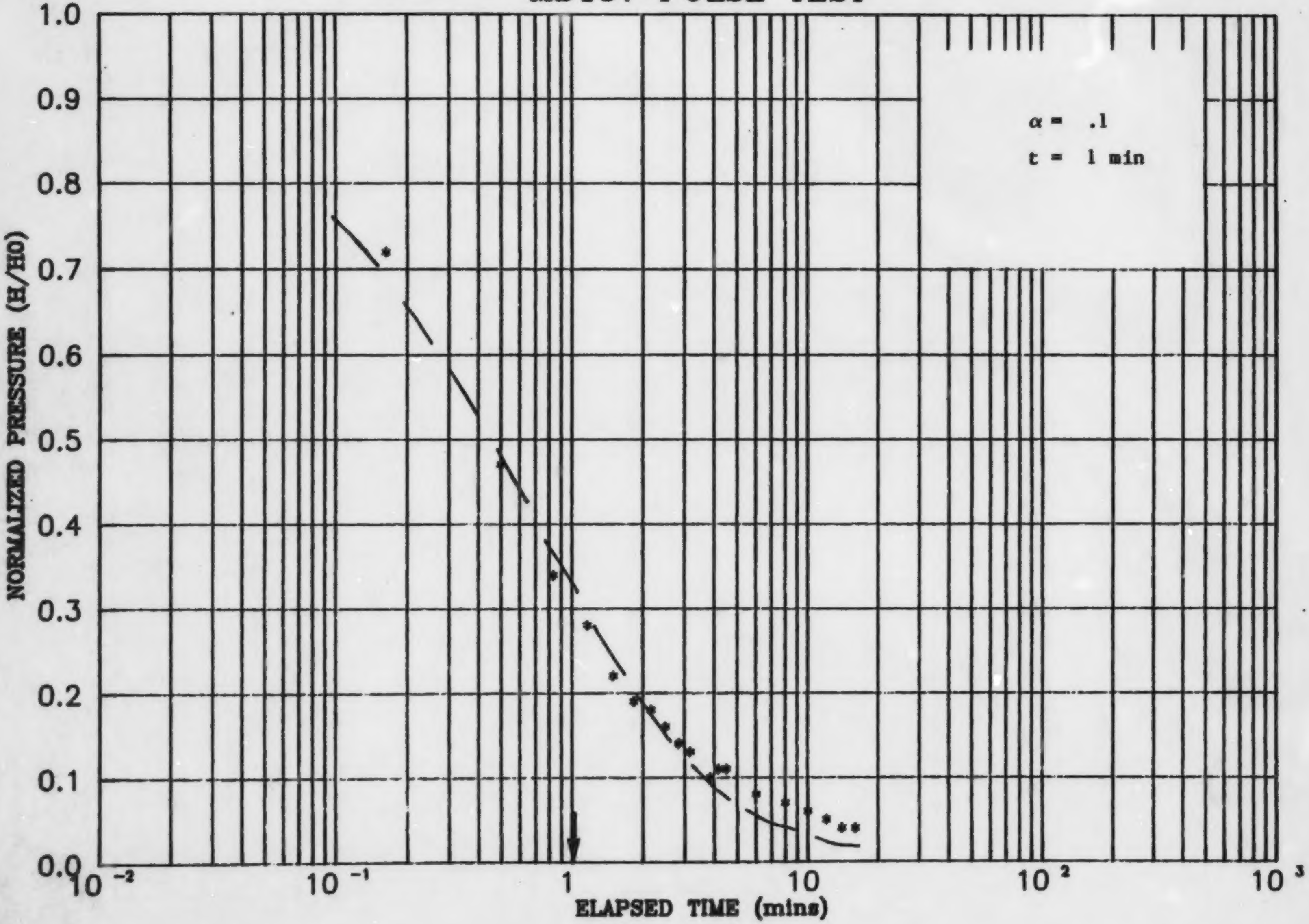


MD125 PULSE TEST



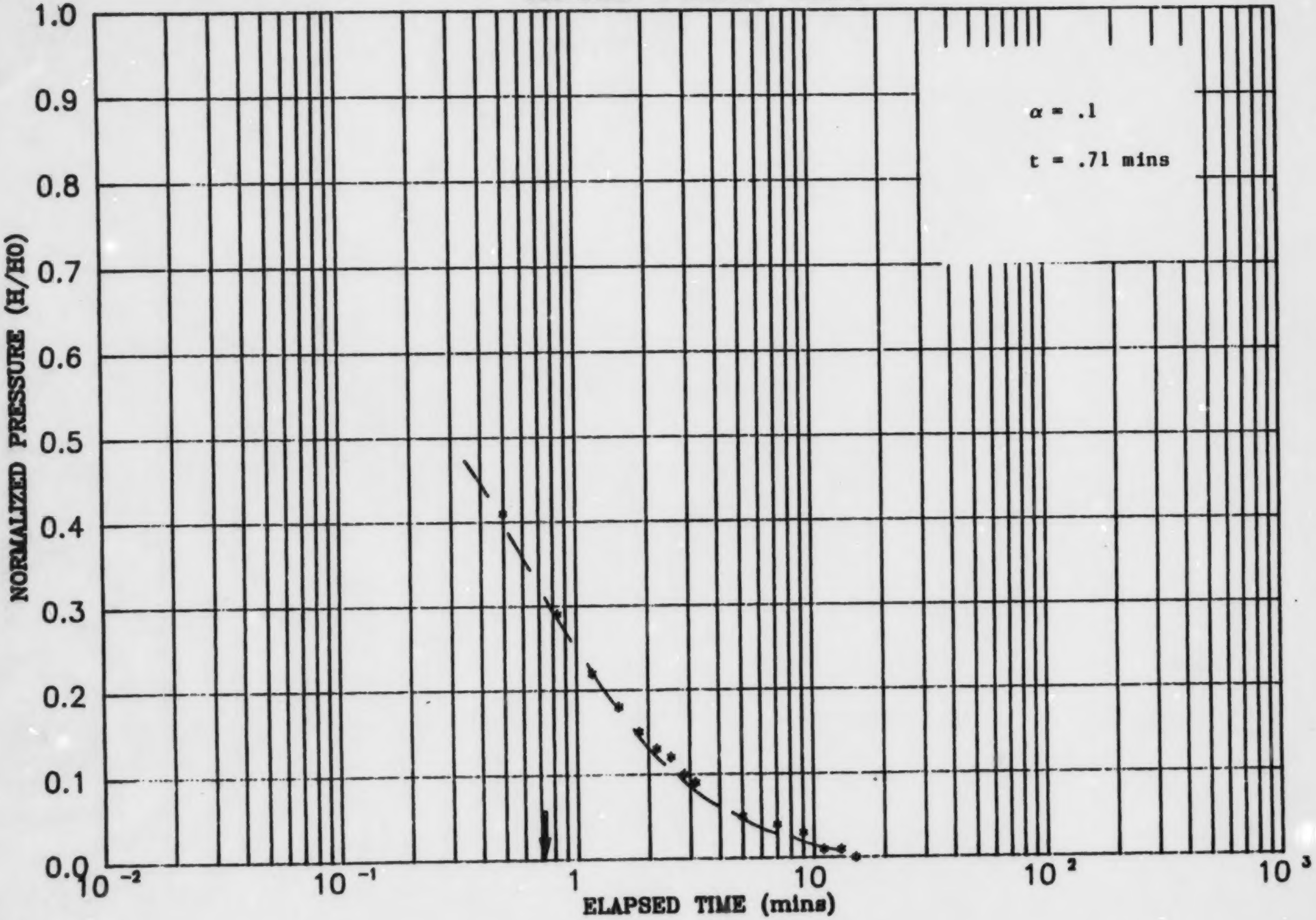

MD127 PULSE TEST
α = .5
t = .13 mins
NORMALIZED PRESSURE (H/HO)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}
ELAPSED TIME (mins)

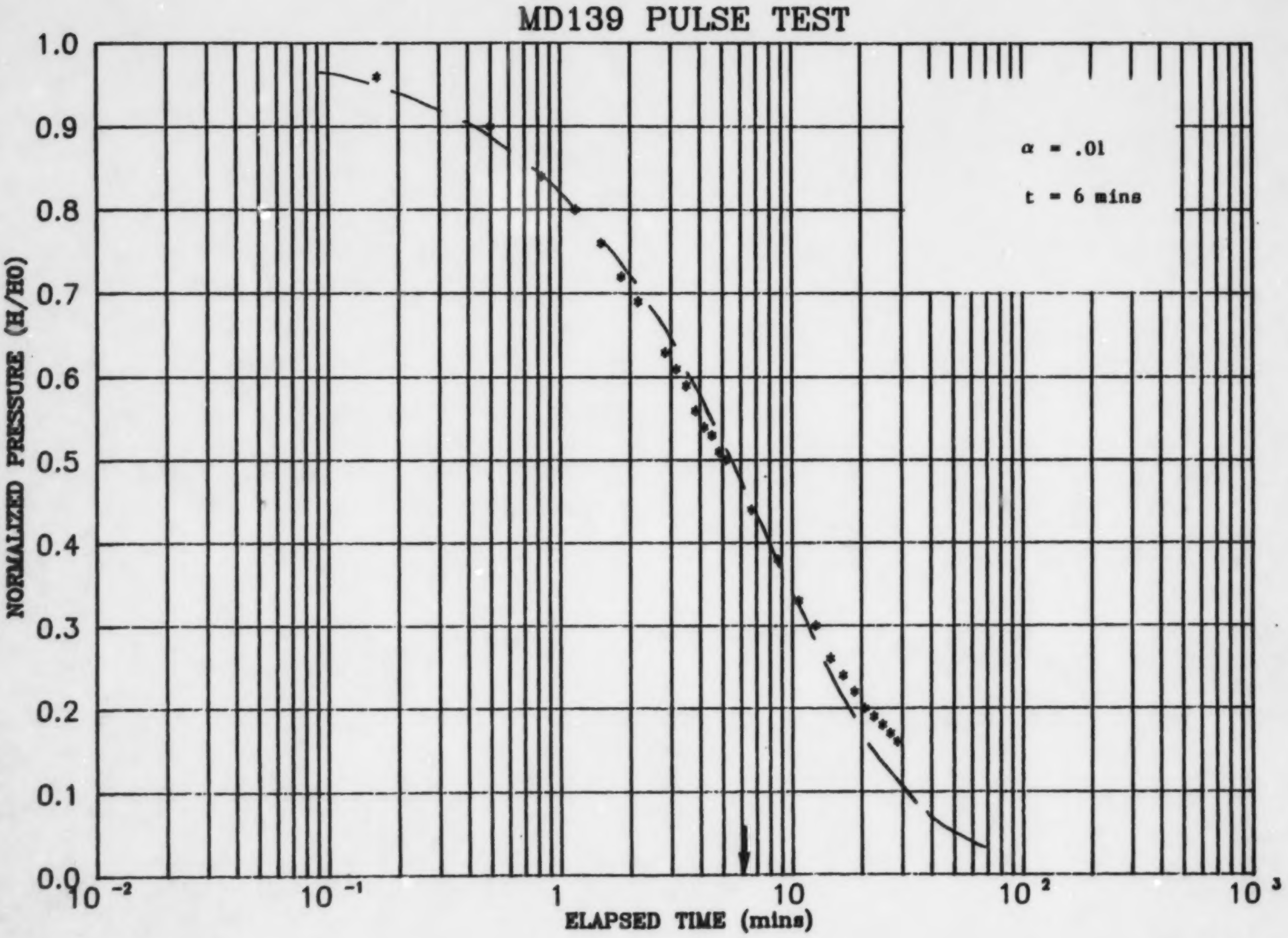

MD128 PULSE TEST
NORMALIZED PRESSURE (H/H0)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}
ELAPSED TIME (mins)
α = .1
t = .42 mins



MD137 PULSE TEST

MD138 PULSE TEST

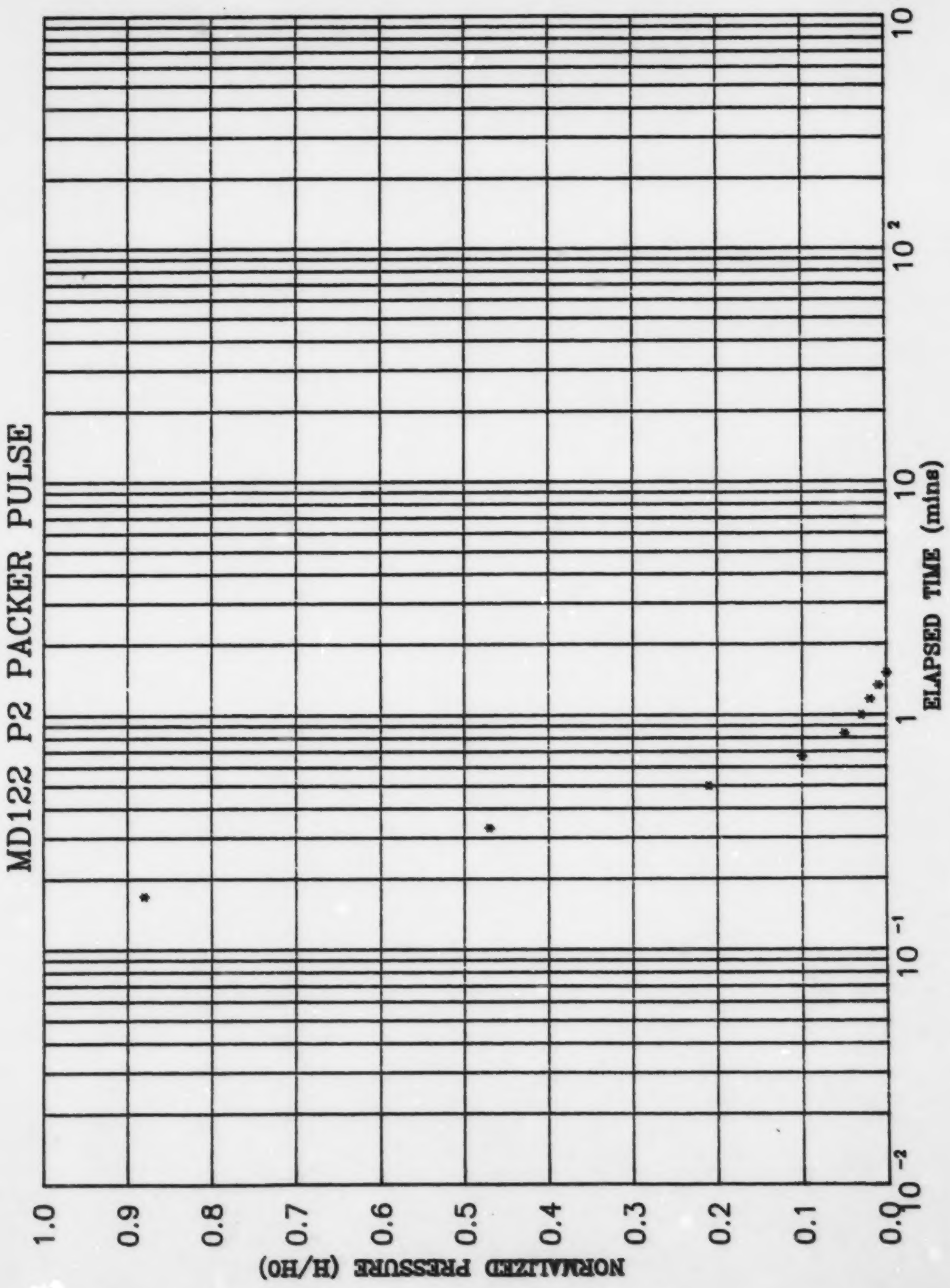


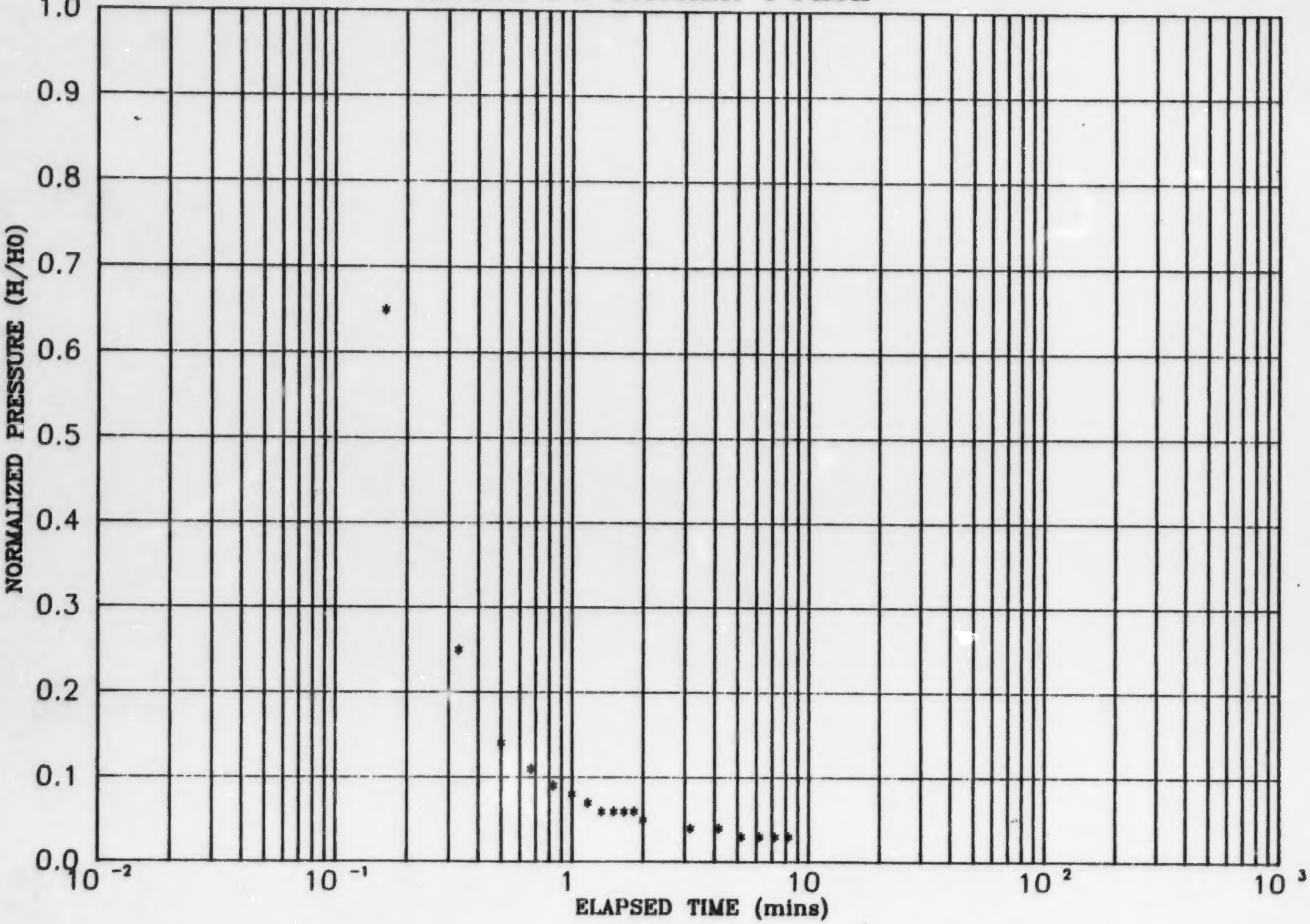

MD139 PULSE TEST
α = .01
t = 6 mins
NORMALIZED PRESSURE (H/HO)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (mins)
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}

APPENDIX I3

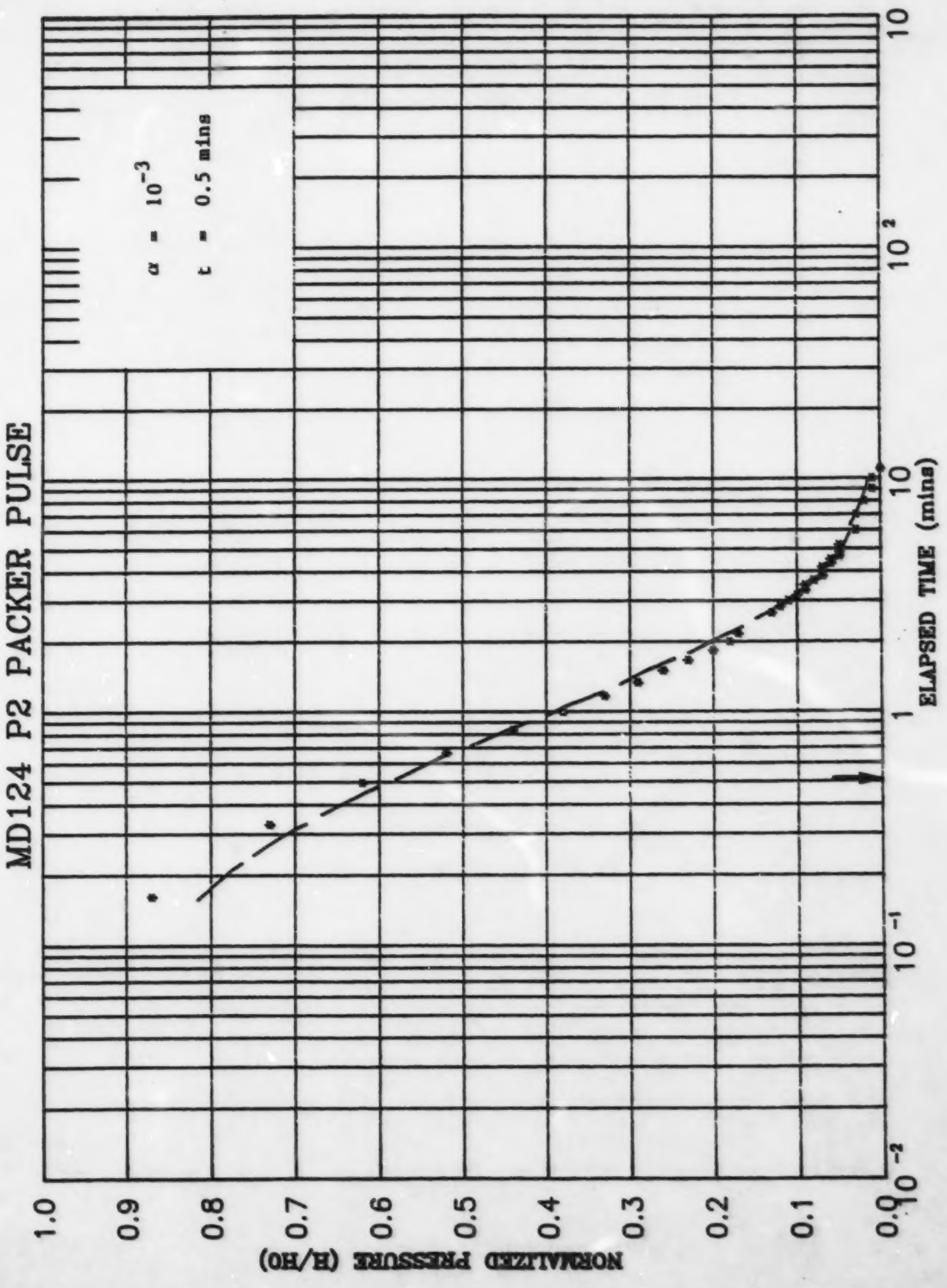
Data Plots and Type Curve Analyses
(P2) Packer Pulse Tests

Borehole MDMW-1

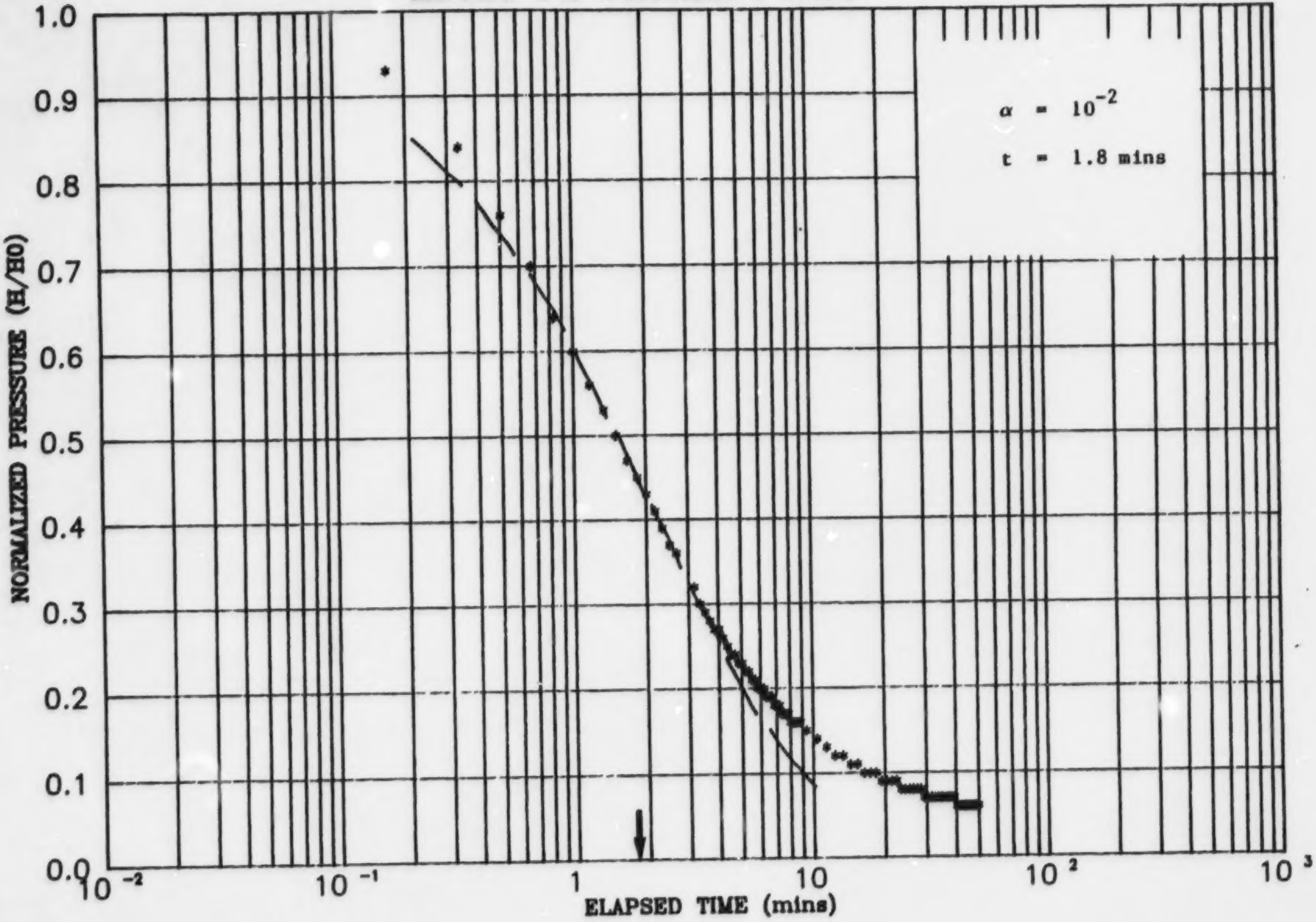

MD122 P2 PACKER PULSE
NORMALIZED PRESSURE (H/HO)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (mins)
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}

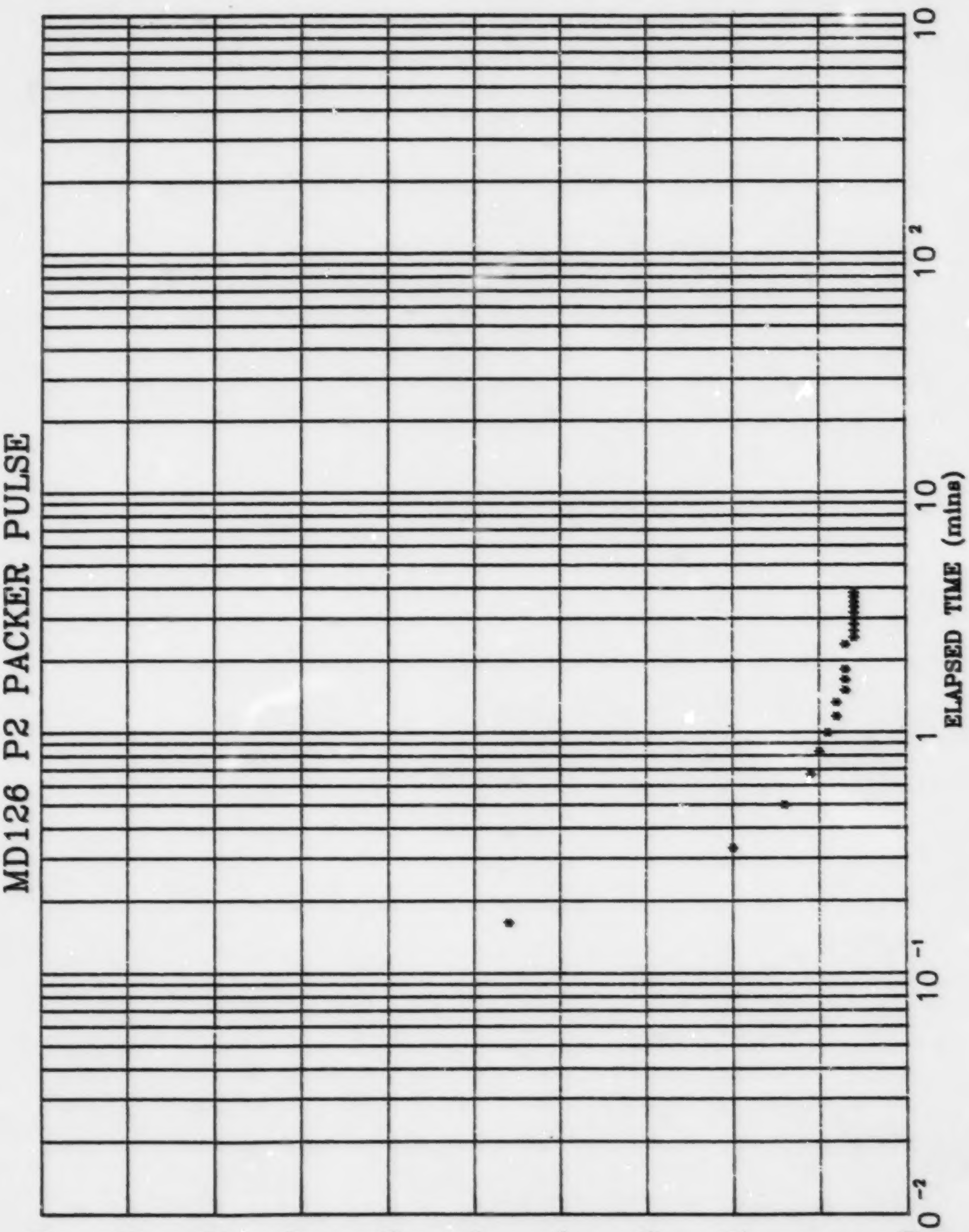


MD123 P2 PACKER PULSE

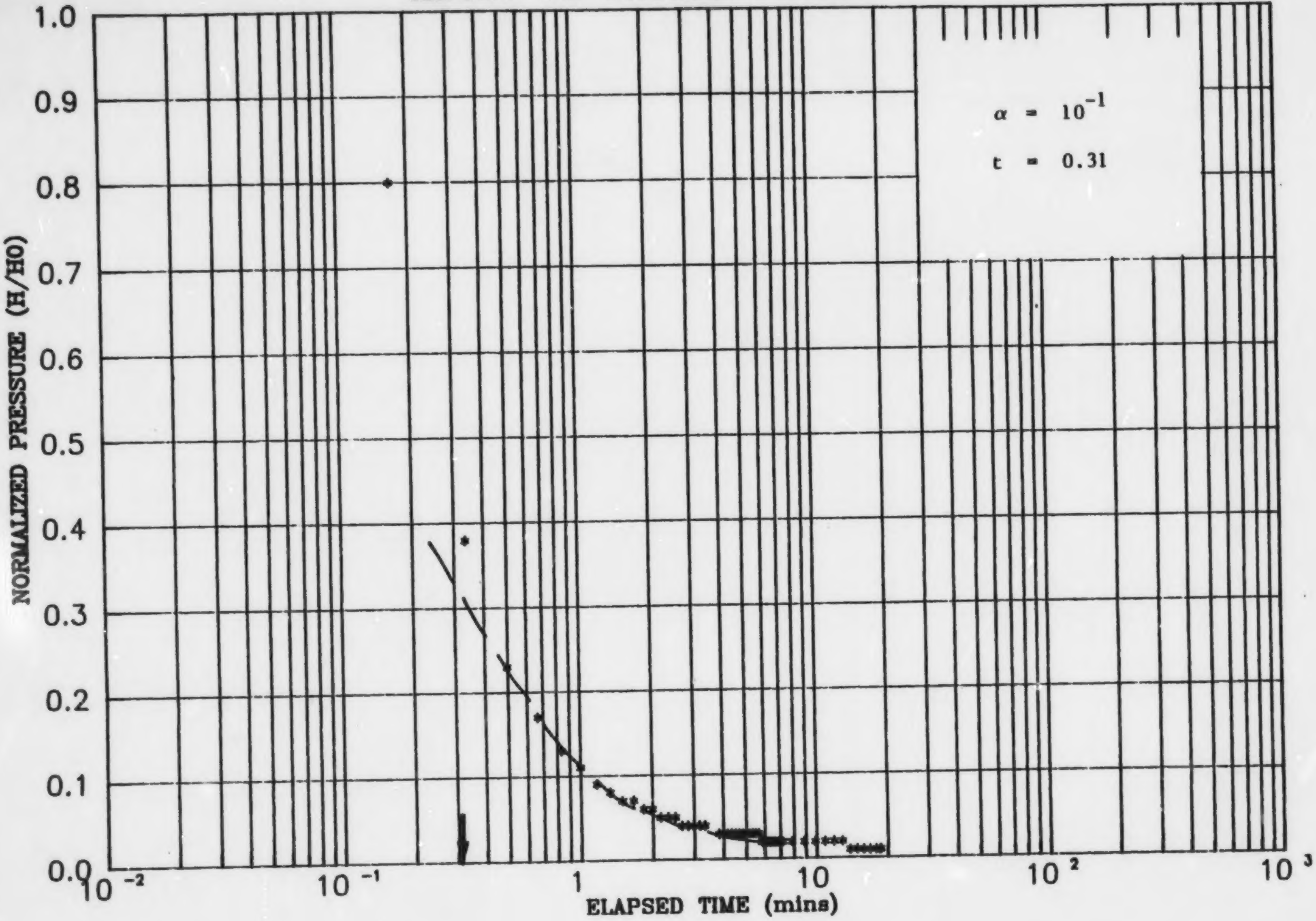

MD124 P2 PACKER PULSE
α = 10^-3
t = 0.5 mins
NORMALIZED PRESSURE (H/HO)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (mins)
10^-2
10^-1
1
10
10^2
10^3

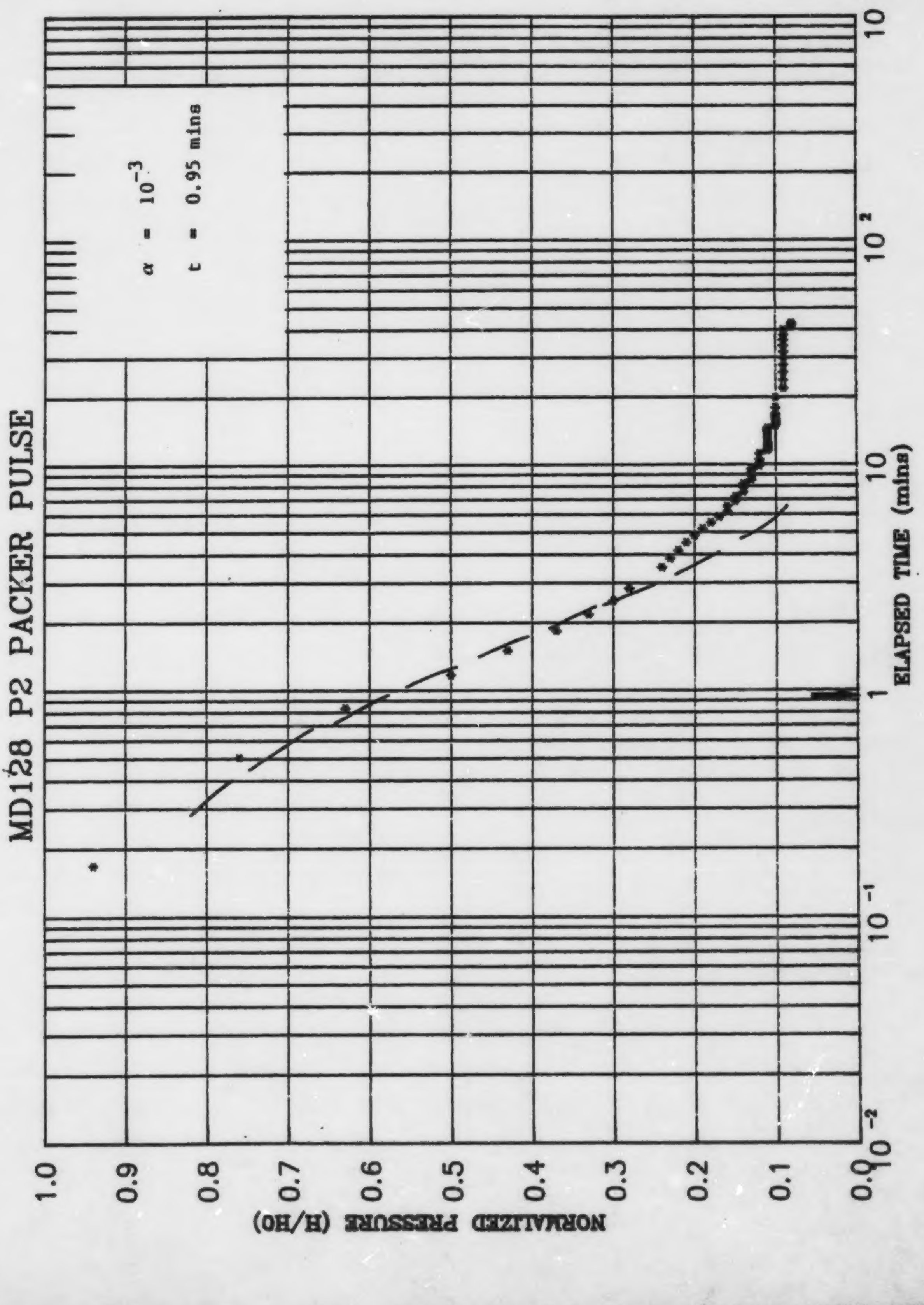
MD125 P2 PACKER PULSE



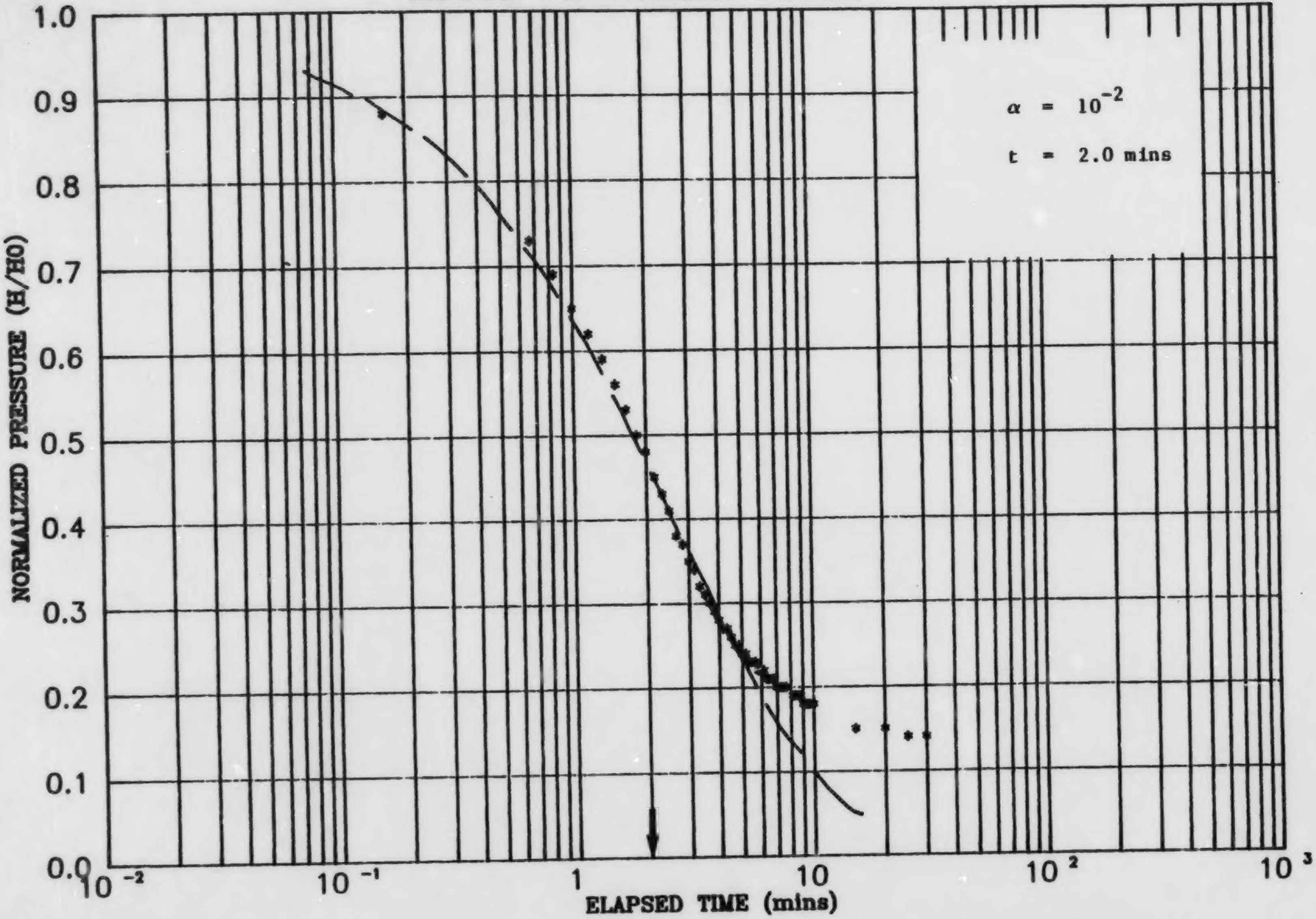

MD126 P2 PACKER PULSE
NORMALIZED PRESSURE (H/HO)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (mins)
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}

MD127 P2 PACKER PULSE

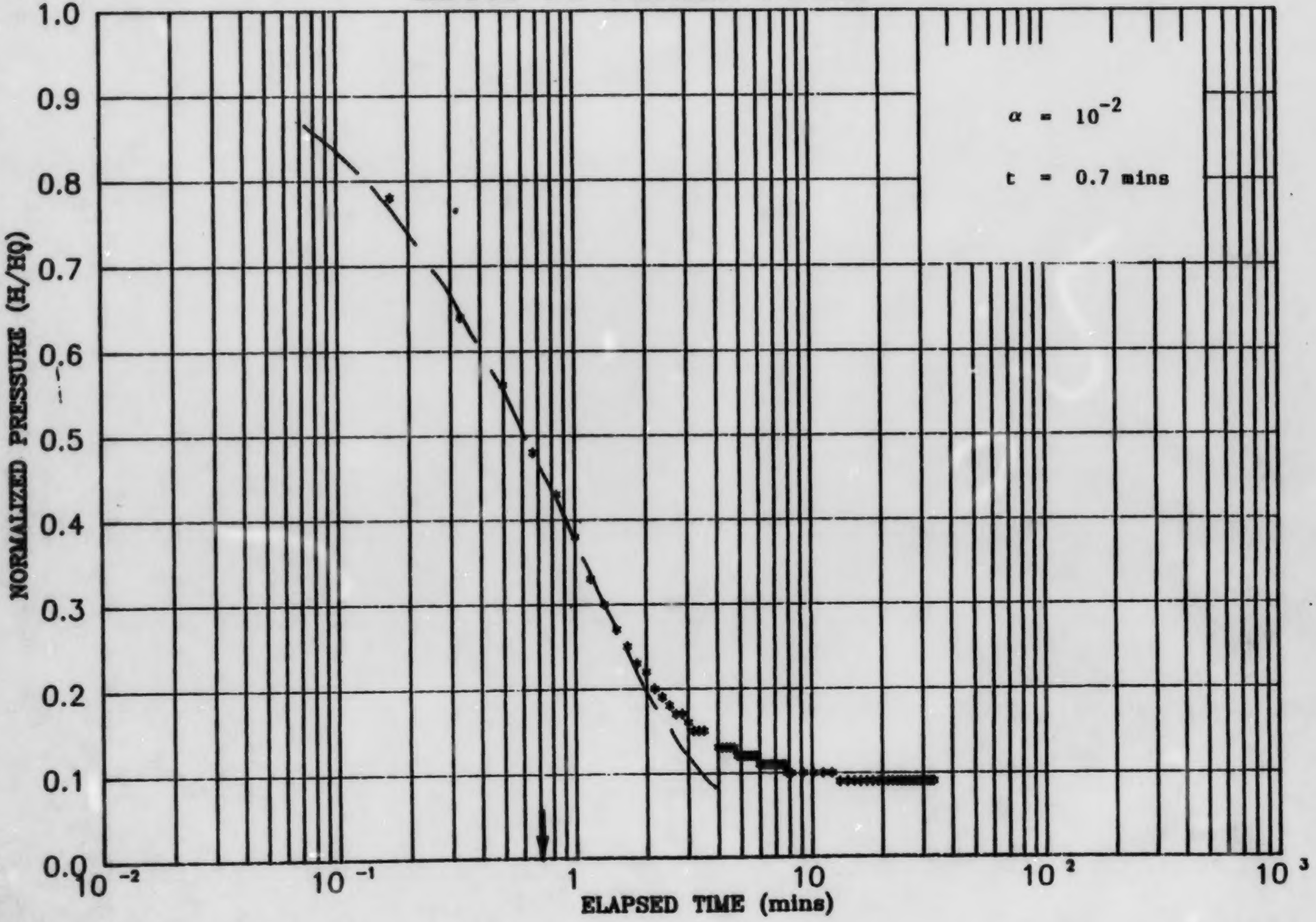


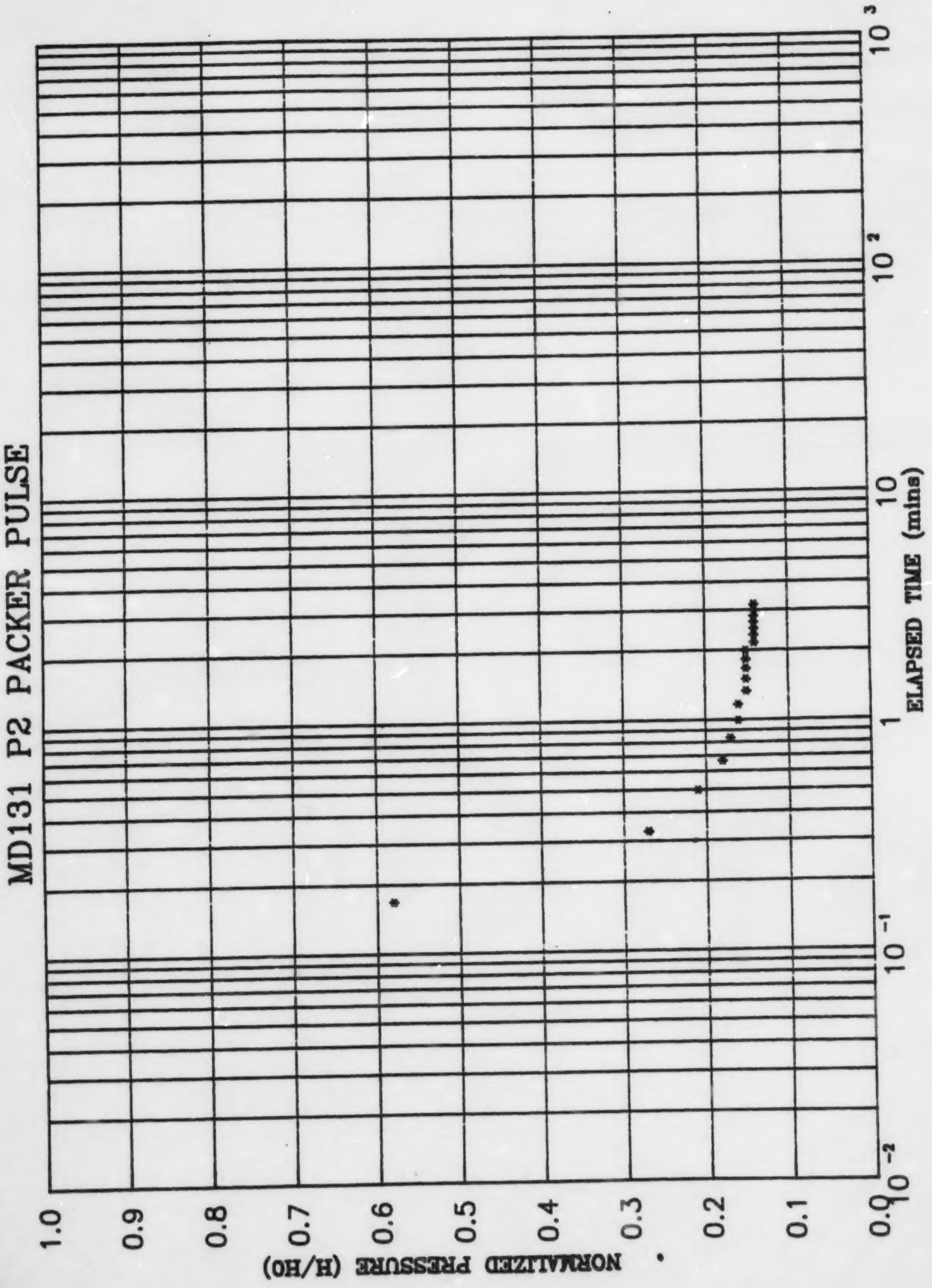

MD1128 P2 PACKER PULSE
α = 10^-3
t = 0.95 mins
NORMALIZED PRESSURE (H/HO)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ELAPSED TIME (mins)
10^-2
10^-1
1
10
10^2
10^3

MD129 P2 PACKER PULSE



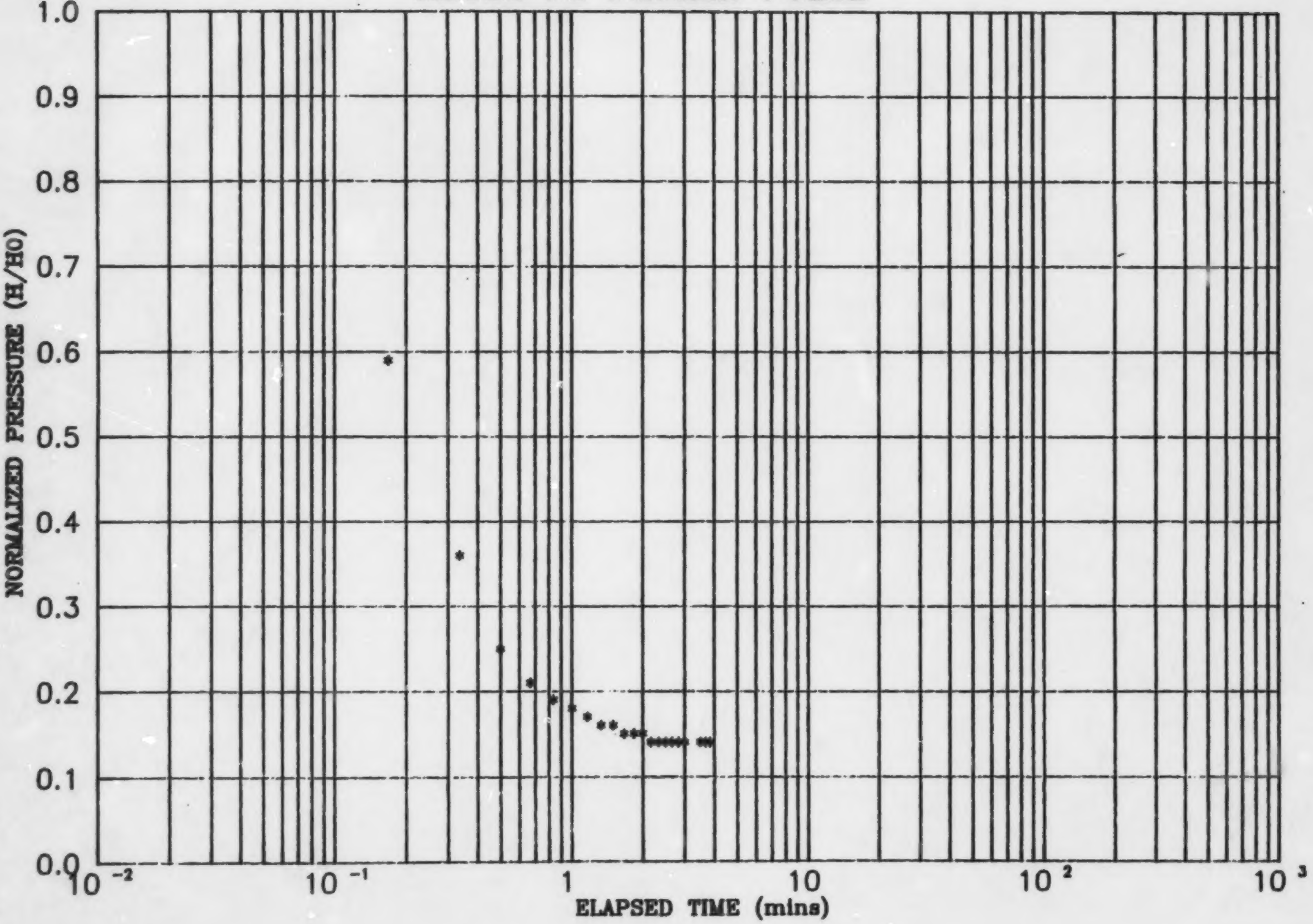
MD130 P2 PACKER PULSE



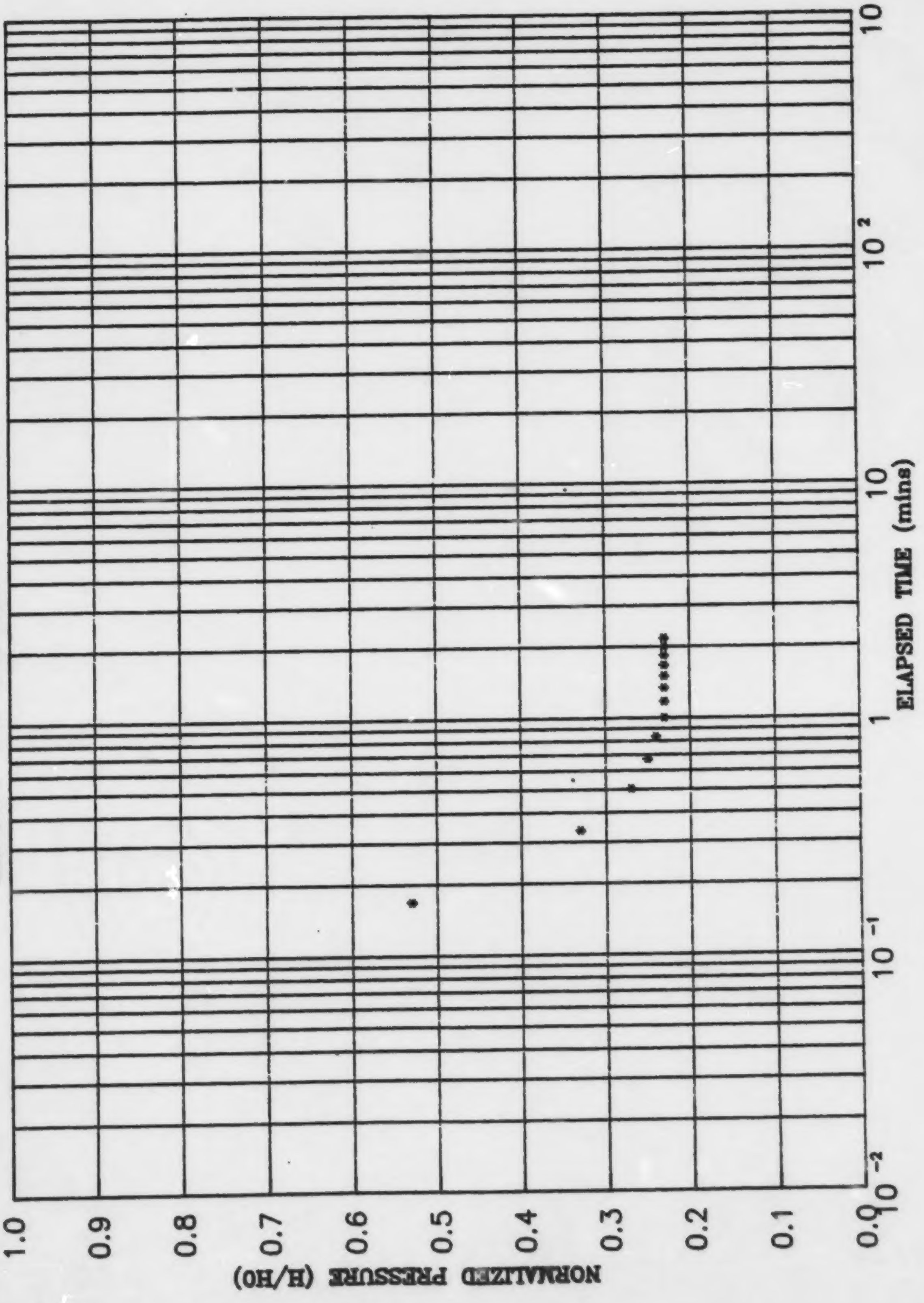


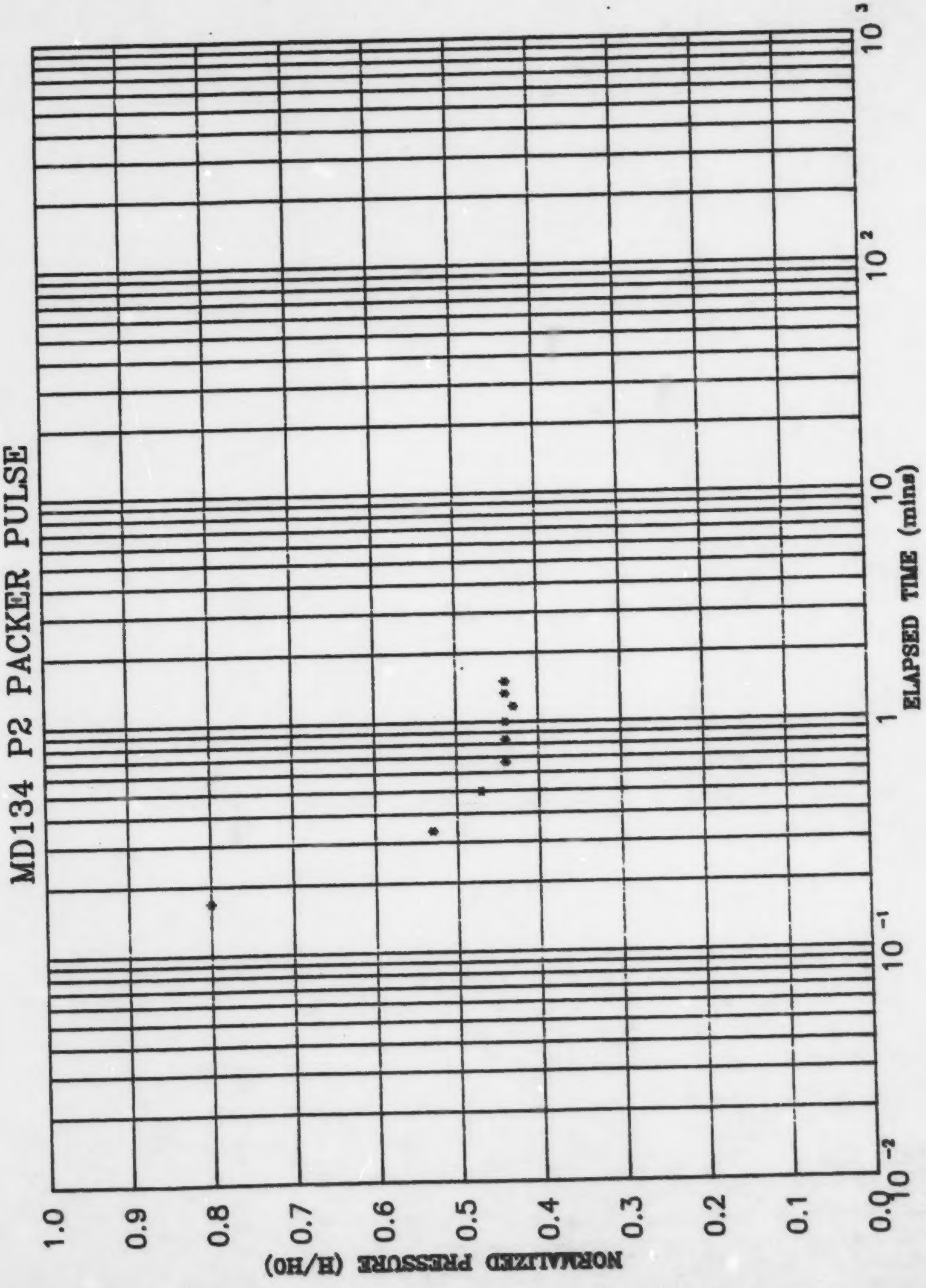
MD131 P2 PACKER PULSE

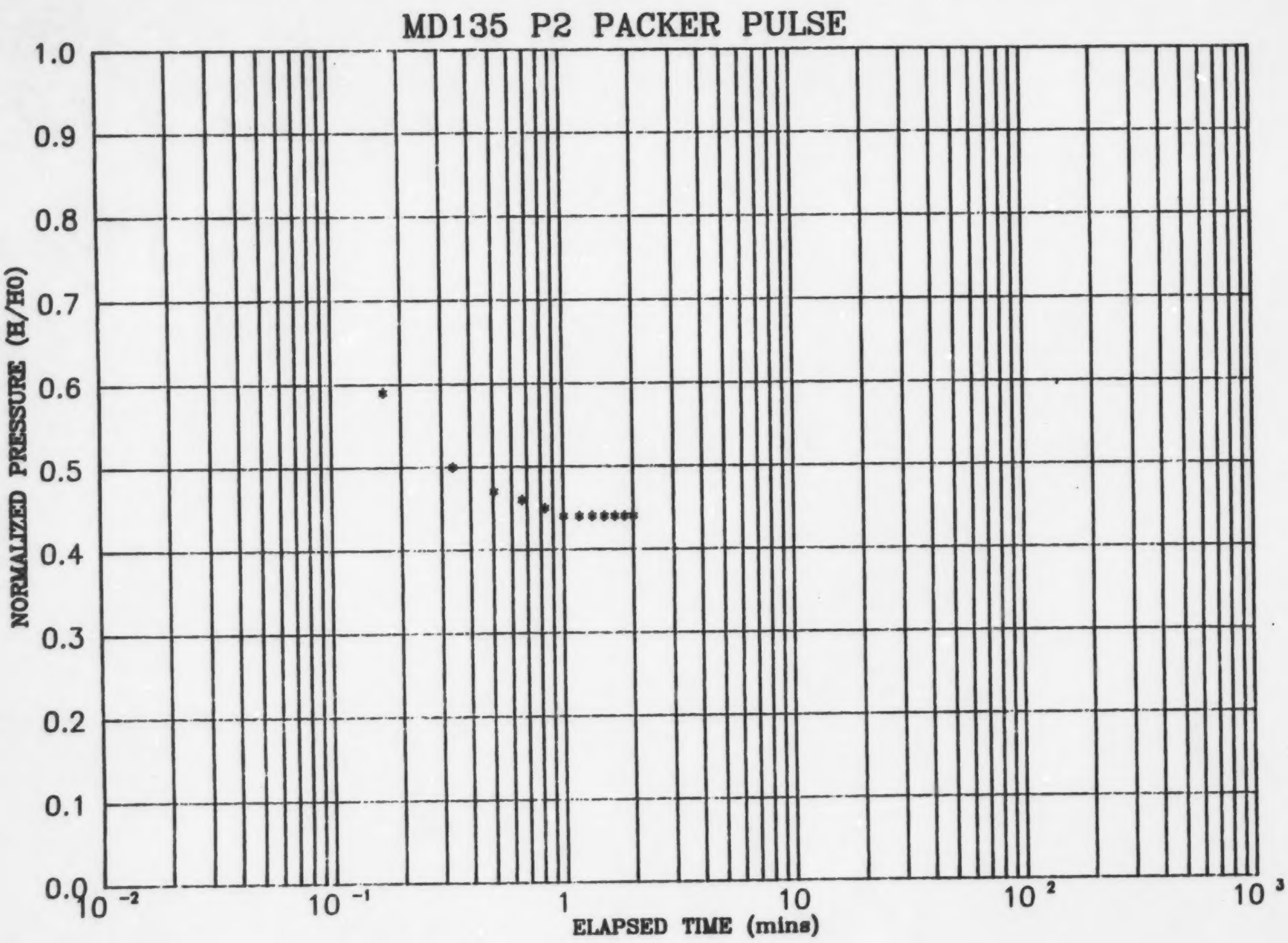
MD132 P2 PACKER PULSE



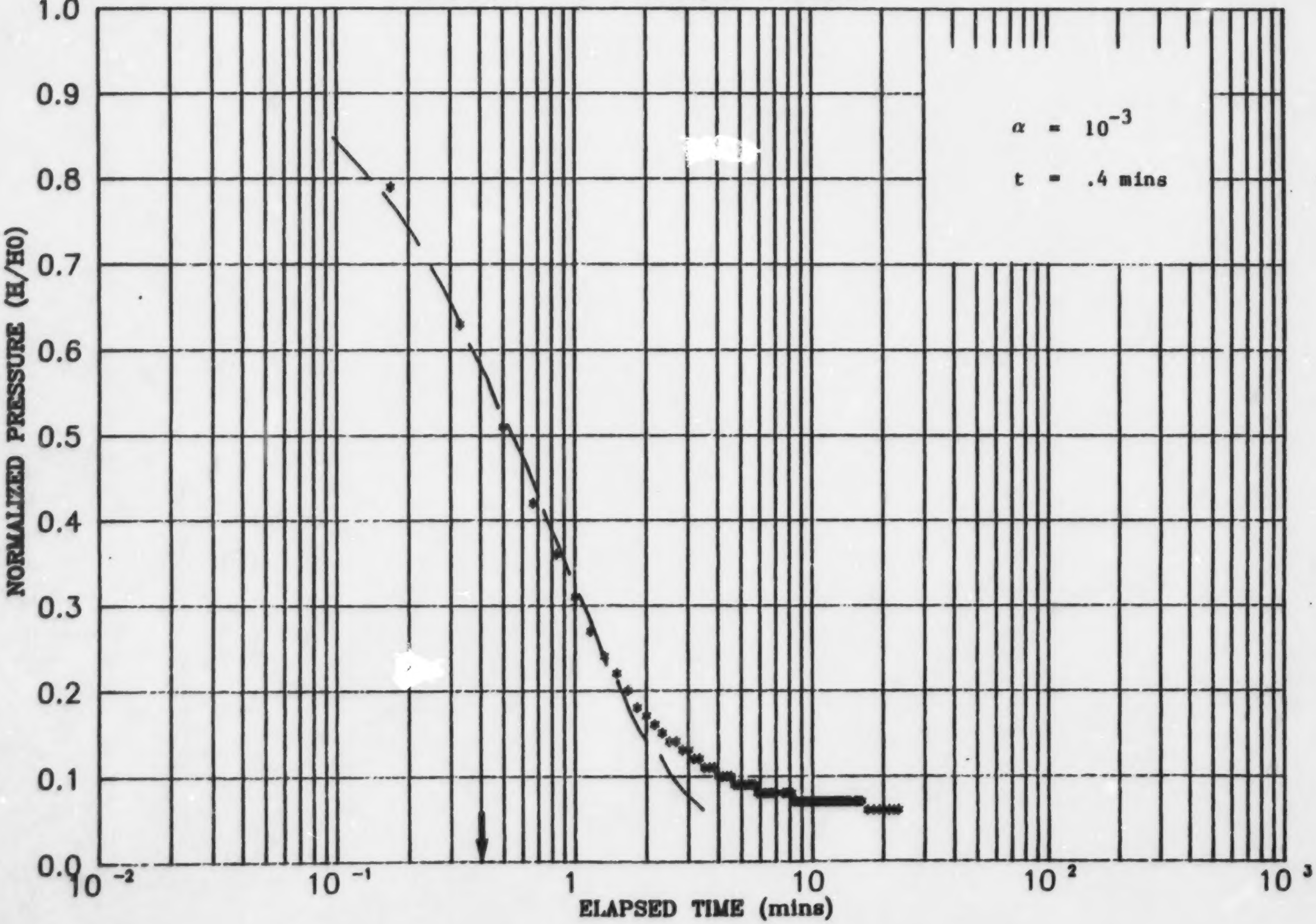
MD133 P2 PACKER PULSE



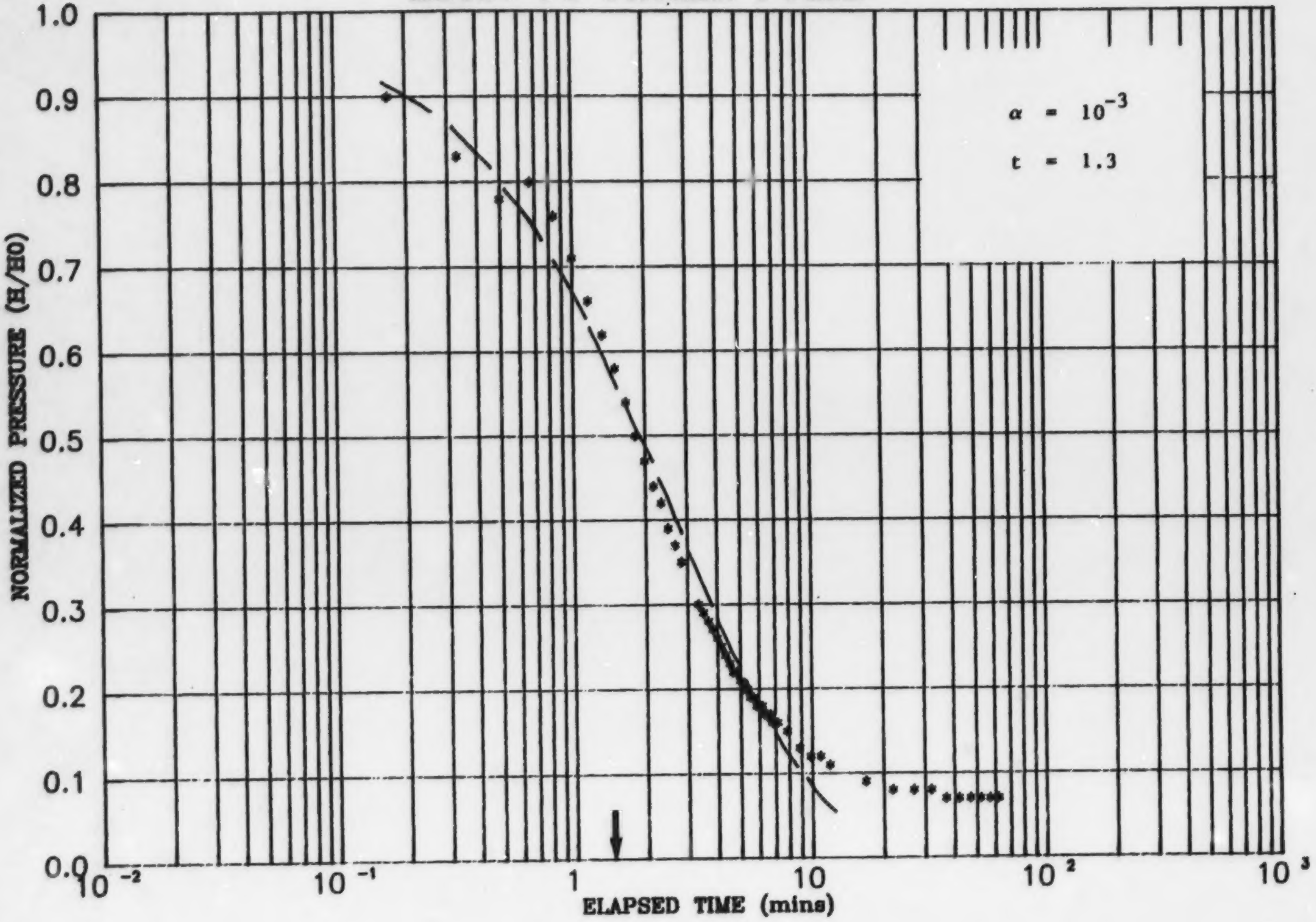

MD134 P2 PACKER PULSE


MD135 P2 PACKER PULSE

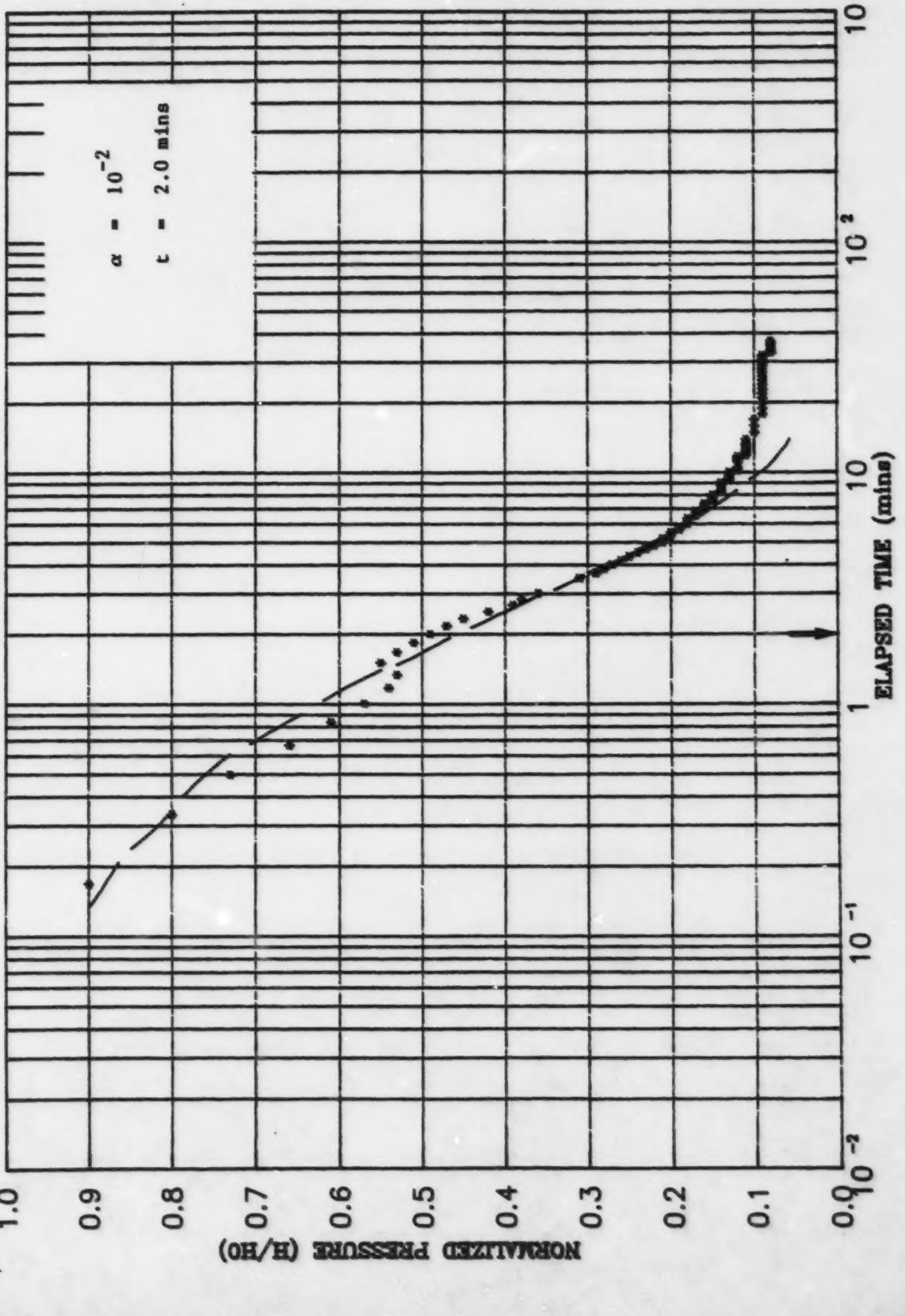
MD136 P2 PACKER PULSE



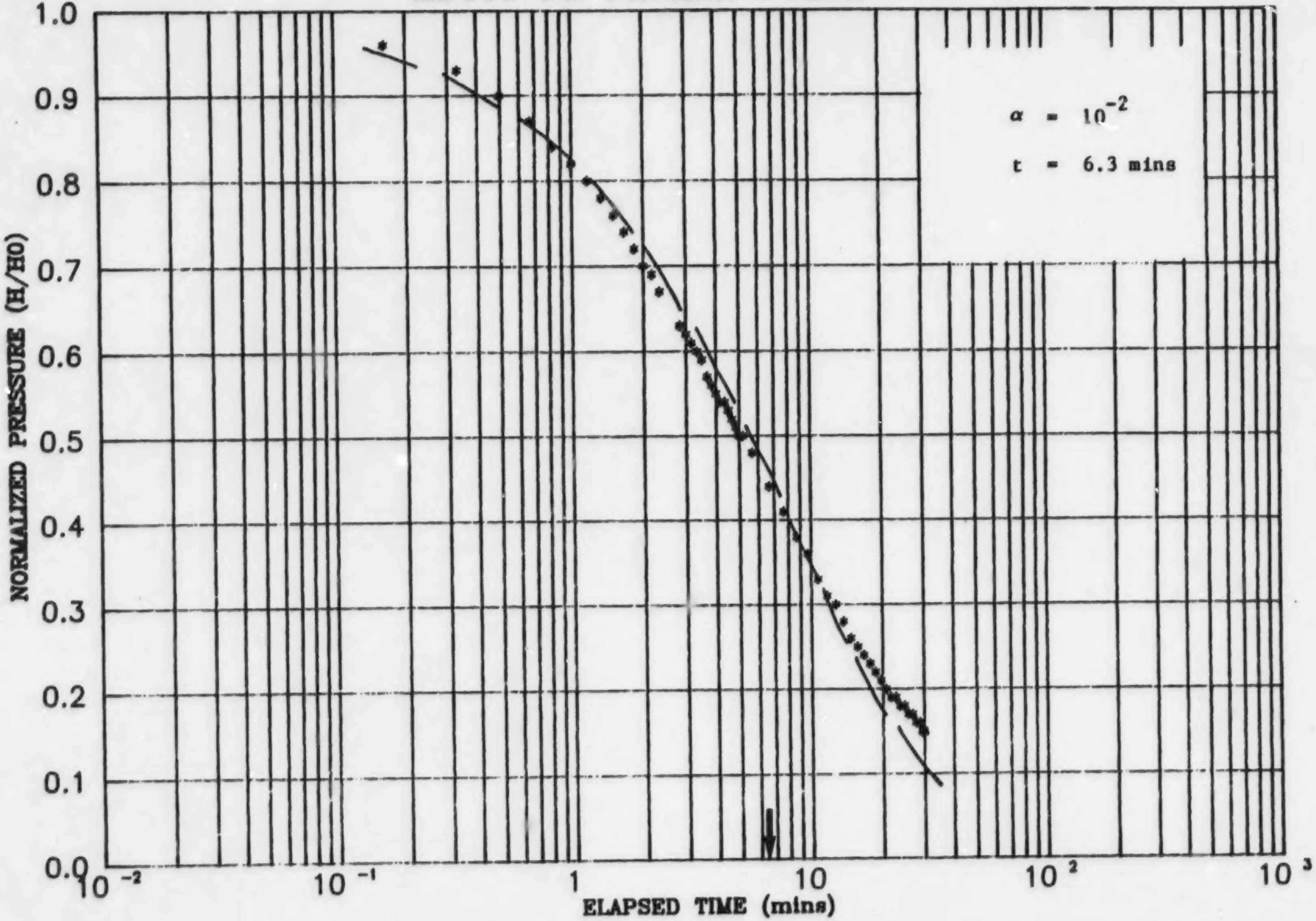
MD137 P2 PACKER PULSE



MD138 P2 PACKER PULSE



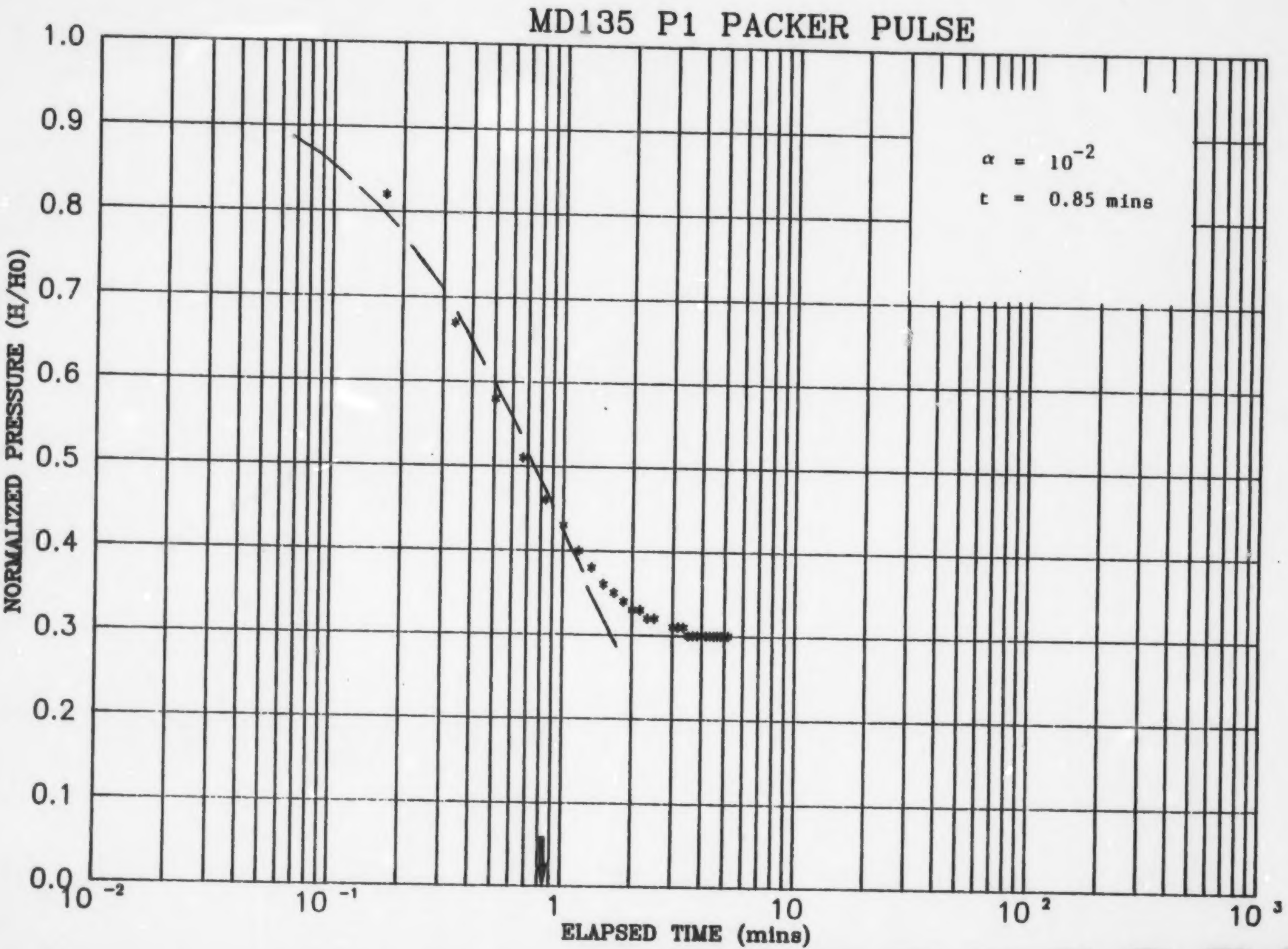
MD139 P2 PACKER PULSE



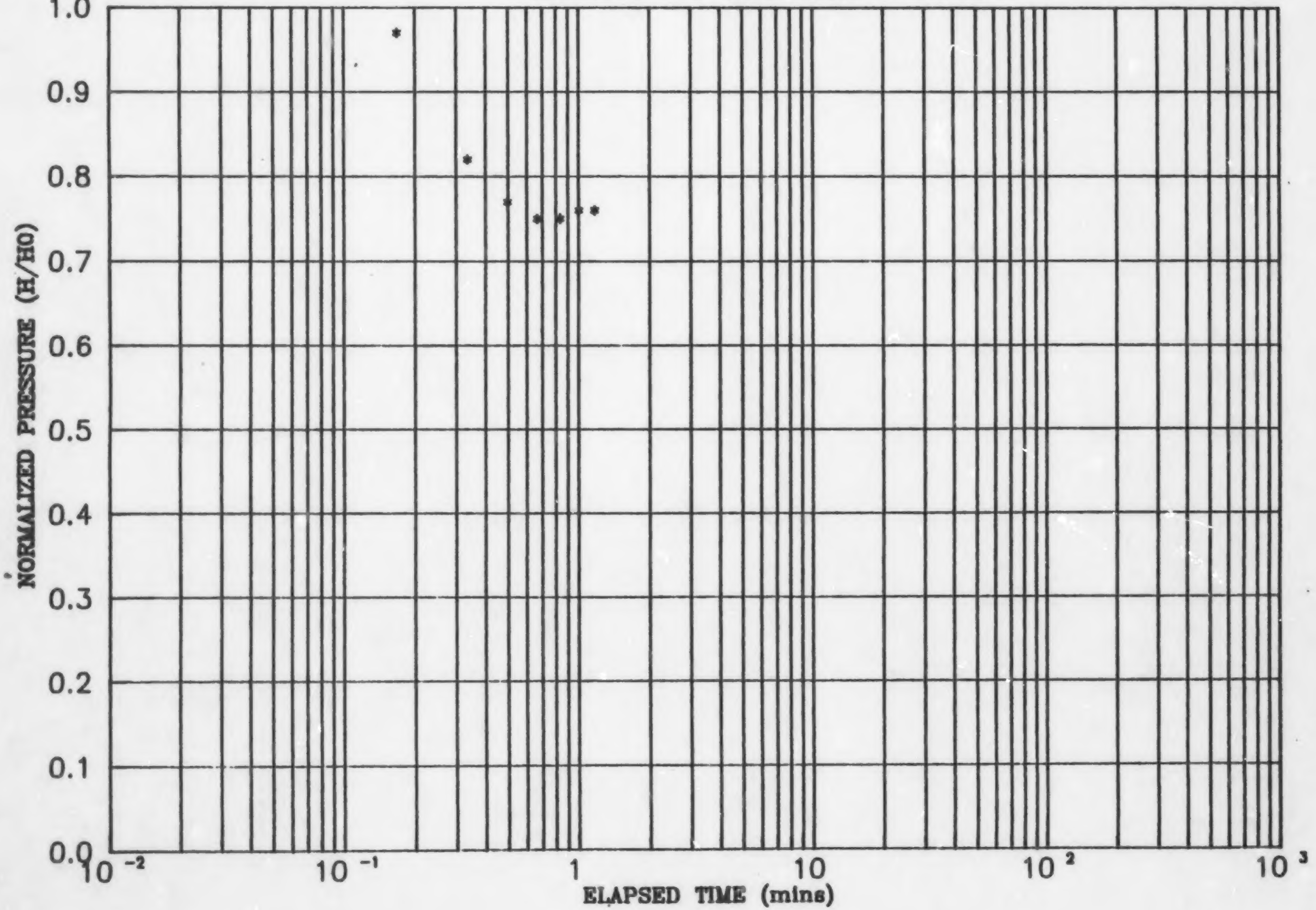
APPENDIX I4

Data Plots and Type Curve Analyses (P1) (Below Probe) Packer Pulse Tests

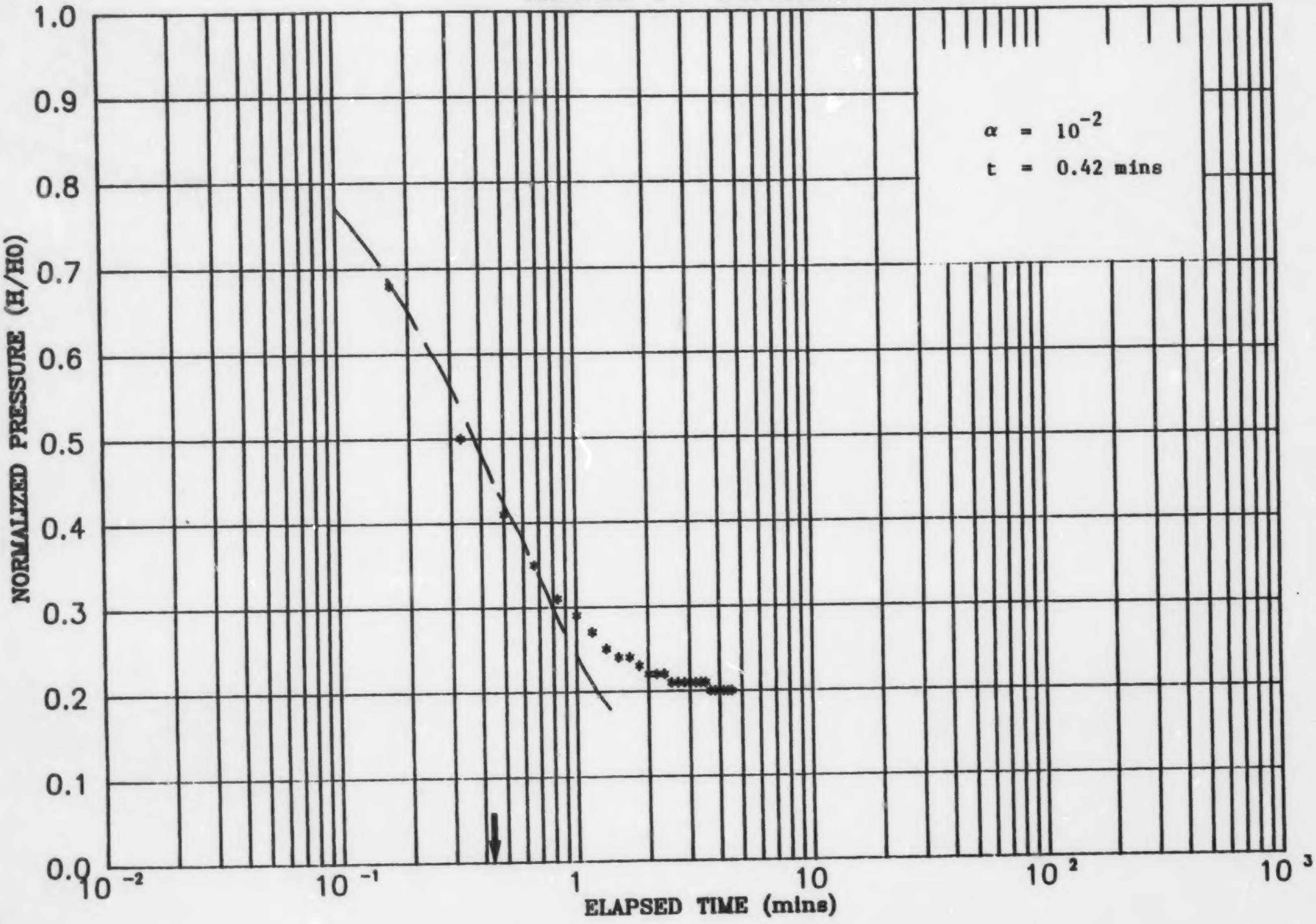
Borehole MDMW-1


MD135 P1 PACKER PULSE
$\alpha = 10^{-2}$
t = 0.85 mins
NORMALIZED PRESSURE (H/H0)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10^{-2}
10^{-1}
1
10
10^{2}
10^{3}
ELAPSED TIME (mins)

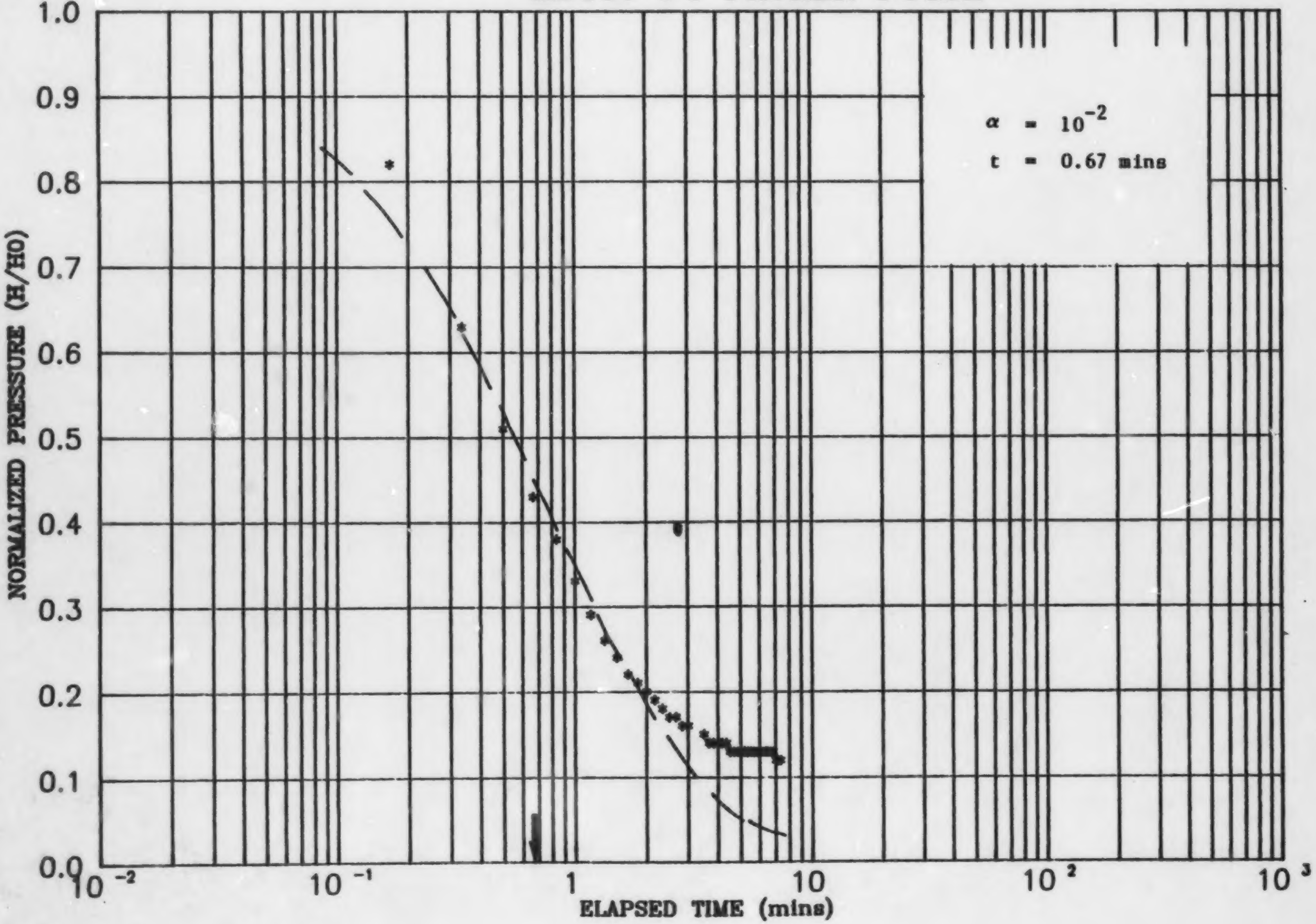
MD134 P1 PACKER PULSE



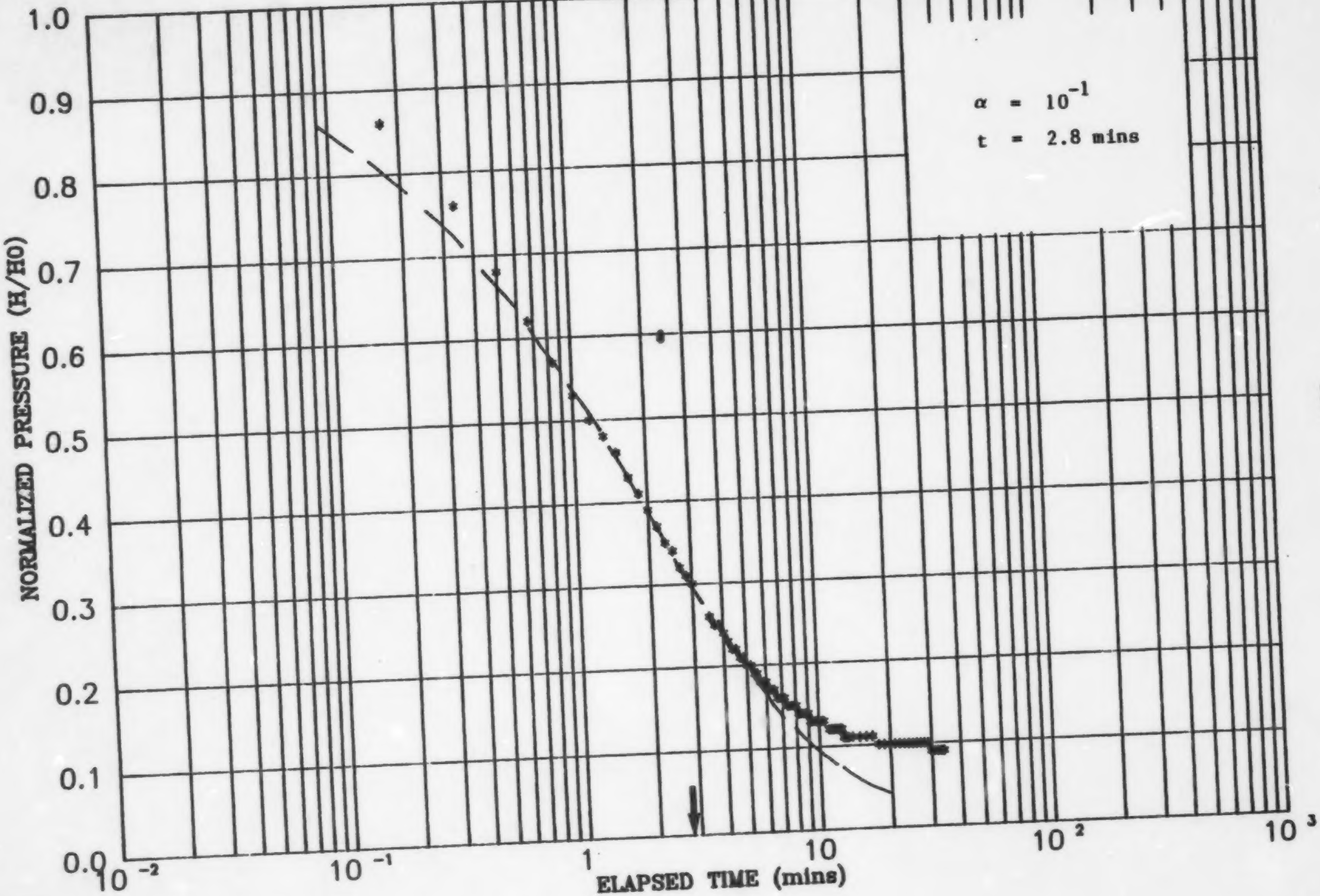
MD136 P1 PACKER PULSE



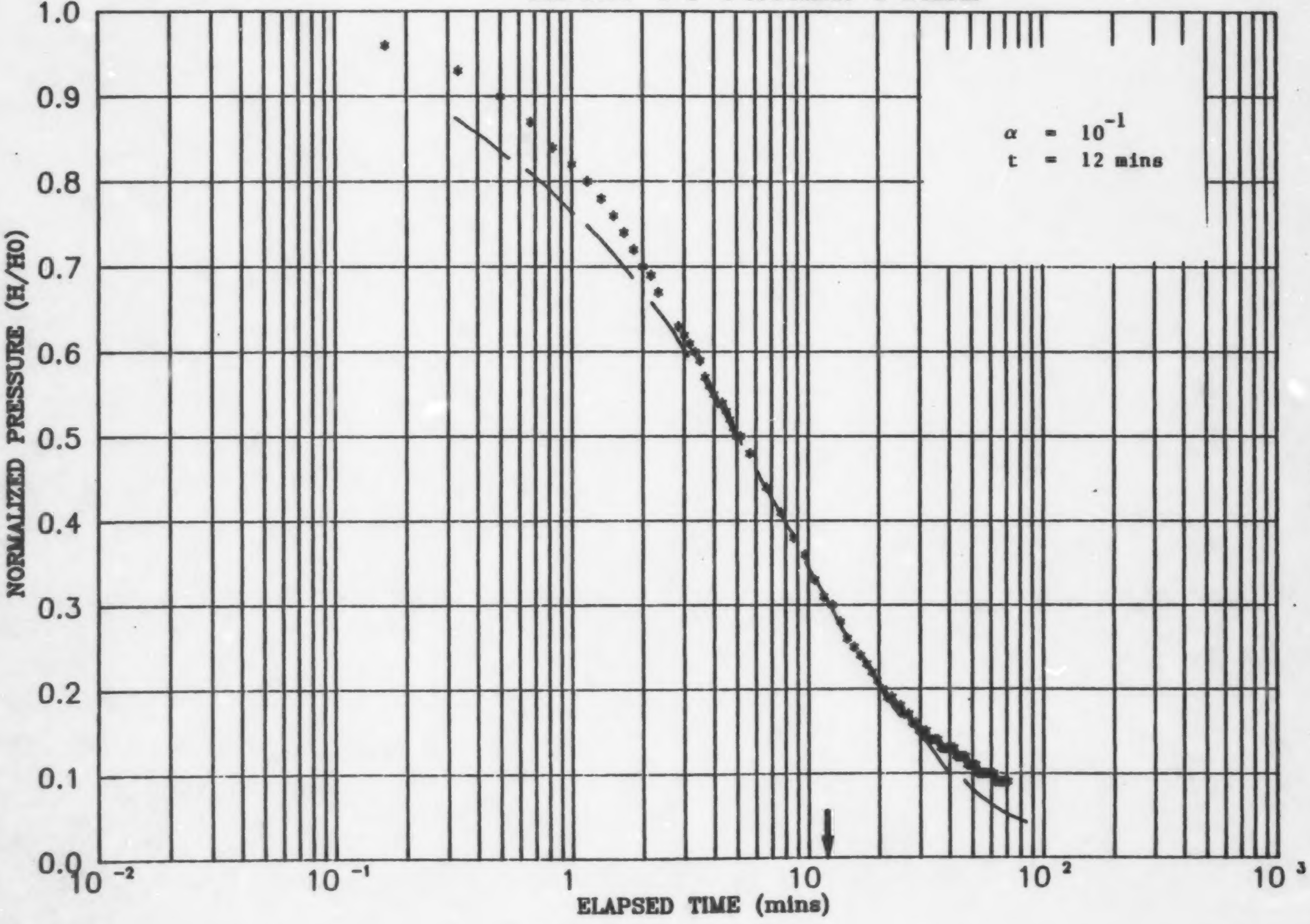
MD137 P1 PACKER PULSE



MD138 P1 PACKER PULSE



MD139 P1 PACKER PULSE



APPENDIX J

Pressure Profiles and Calculated Equivalent Fresh Water Heads

Borehole MDMW-1

MOE - SARNIA
PRESSURE PROFILES FOR THE DEEP MONITORING WELL (MDMW-1)

Port Depth (m)	Packer Interval m (BCT)			Survey Date October 25, 1987				Survey Date October 26, 1987			
	Top	Bottom	Midpoint	Outside Casing (p.s.i.)	Inside Casing (p.s.i.)	Change in Pressure	Equivalent Fresh Water Head (mAMSL)	Outside Casing (p.s.i.)	Inside Casing (p.s.i.)	Change in Pressure	Equivalent Fresh Water Head (mAMSL)
27.0	18.0	36.0	27.0	63.3	53.7	9.6	190.96	55.4	53.7	1.7	185.41
42.0	39.0	45.0	42.0	65.6	75.0	-9.4	177.60	64.8	75.0	-10.2	177.03
52.5	49.5	55.5	52.5	97.6	90.0	7.6	189.56	89.0	90.0	-1.0	183.51
61.5	58.5	66.0	62.3	136.9	102.8	34.1	208.20	124.3	102.8	21.5	199.33
75.0	70.5	79.5	75.0	111.6	122.0	-10.4	176.89	112.0	122.0	-10.0	177.18
82.5	82.5	85.5	84.0	138.1	132.8	5.3	187.94	132.6	132.8	-.2	184.07
91.5	88.5	97.5	93.0	160.2	145.6	14.6	194.48	149.8	145.6	4.2	187.16
103.5	100.5	106.5	103.5	178.2	162.6	15.6	195.18	165.8	162.6	3.2	186.46
111.0	109.5	114.0	111.8	191.0	173.3	17.7	196.66	177.6	173.3	4.3	187.23
123.0	117.0	126.0	121.5	204.7	190.4	14.3	194.27	191.3	190.4	.9	184.84
132.0	129.0	135.0	132.0	225.5	203.1	22.4	199.97	217.2	203.1	14.1	194.13
141.0	138.0	144.0	141.0	240.9	216.0	24.9	201.73	243.6	216.0	27.6	203.63
153.0	148.5	156.0	152.3	251.8	233.1	18.7	197.37	250.6	233.1	17.5	196.52
162.0	159.0	165.0	162.0	264.9	246.0	18.9	197.51	262.3	246.0	16.3	195.68
174.0	168.0	177.0	172.5	256.5	263.0	-6.5	179.64	256.3	263.0	-6.7	179.50
180.0	180.0	183.0	181.5	258.4	271.5	-13.1	174.99	258.3	271.5	-13.2	174.92
186.0	186.0	196.5	191.3	264.0	280.0	-16.0	172.95	263.8	280.0	-16.2	172.81
192.0	186.0	196.5	191.3	273.2	288.8	-15.6	173.24	273.1	288.8	-15.7	173.17
201.0	201.0	211.5	206.3	285.8	301.7	-15.9	173.02	285.7	301.7	-16.0	172.95
207.0	201.0	211.5	206.3	295.7	310.2	-14.5	174.01	295.6	310.2	-14.6	173.94
219.0	216.0	222.0	219.0	317.3	327.4	-10.1	177.10	317.1	327.4	-10.3	176.96
228.0	225.0	231.0	228.0	337.8	340.3	-2.5	182.45	337.8	340.3	-2.5	182.45
240.0	234.0	243.0	238.5	358.1	357.4	.7	184.70	358.1	357.4	.7	184.70
249.0	246.0	252.0	249.0	378.5	370.1	8.4	190.12	378.8	370.1	8.7	190.33
258.0	255.0	261.0	258.0	393.2	382.8	10.4	191.53	393.4	382.8	10.6	191.67
262.5	262.5	262.5	262.5	401.5	389.3	12.2	192.79	401.2	389.3	11.9	192.58
271.5	265.5	274.5	270.0	414.7	402.1	12.6	193.07	414.9	402.1	12.8	193.21
280.5	277.5	286.5	282.0	428.1	414.9	13.2	193.50	428.5	414.9	13.6	193.78
291.0	291.0	300.0	295.5	442.3	429.8	12.5	193.00	443.0	429.8	13.2	193.50
297.0	291.0	300.0	295.5	452.8	438.2	14.6	194.48	454.1	438.2	15.9	195.40

Note: All "inside casing" values are from the October 25, 1987 survey.

MOE - SARNIA

PRESSURE PROFILES FOR THE DEEP MONITORING WELL (MDMW-1)

Port Depth (m)	Packer Interval m (BCT)			Survey Date October 28, 1987				Survey Date November 6, 1987			
	Top	Bottom	Midpoint	Outside Casing (p.s.i.)	Inside Casing (p.s.i.)	Change in Pressure	Equivalent Fresh Water Head (mAMSL)	Outside Casing (p.s.i.)	Inside Casing (p.s.i.)	Change in Pressure	Equivalent Fresh Water Head (mAMSL)
27.0	18.0	36.0	27.0	52.4	53.7	-1.3	183.30	51.6	53.7	-2.1	182.73
42.0	39.0	45.0	42.0	64.5	75.0	-10.5	176.82	65.5	75.0	-9.5	177.53
52.5	49.5	55.5	52.5	84.0	90.0	-6.0	179.99	80.6	90.0	-9.4	177.60
61.5	58.5	66.0	62.3	117.2	102.8	14.4	194.34	128.9	102.8	26.1	202.57
75.0	70.5	79.5	75.0	113.2	122.0	-8.8	178.02	115.8	122.0	-6.2	179.85
82.5	82.5	85.5	84.0	130.0	132.8	-2.8	182.24	124.4	132.8	-8.4	178.30
91.5	88.5	97.5	93.0	144.1	145.6	-1.5	183.15	133.7	145.6	-11.9	175.84
103.5	100.5	106.5	103.5	159.8	162.6	-2.8	182.24	152.0	162.6	-10.6	176.75
111.0	109.5	114.0	111.8	171.5	173.3	-1.8	182.94	171.5	173.3	-1.8	182.94
123.0	117.0	126.0	121.5	188.1	190.4	-2.3	182.59	208.5	190.4	18.1	196.94
132.0	129.0	135.0	132.0	214.2	203.1	11.1	192.02	231.7	203.1	28.6	204.33
141.0	138.0	144.0	141.0	246.3	216.0	30.3	205.53	250.3	216.0	34.3	208.34
153.0	148.5	156.0	152.3	250.6	233.1	17.5	196.52	252.9	233.1	19.8	198.14
162.0	159.0	165.0	162.0	260.2	246.0	14.2	194.20	259.1	246.0	13.1	193.43
174.0	168.0	177.0	172.5	256.2	263.0	-6.8	179.43	255.8	263.0	-7.2	179.14
180.0	180.0	183.0	181.5	257.6	271.5	-13.9	174.43	257.8	271.5	-13.7	174.57
186.0	186.0	196.5	191.3	263.6	280.0	-16.4	172.67	263.7	280.0	-16.3	172.74
192.0	186.0	196.5	191.3	273.0	288.8	-15.8	173.09	273.0	288.8	-15.8	173.09
201.0	201.0	211.5	206.3	285.7	301.7	-16.0	172.95	285.5	301.7	-16.2	172.81
207.0	201.0	211.5	206.3	295.7	310.2	-14.5	174.01	295.4	310.2	-14.8	173.80
219.0	216.0	222.0	219.0	317.0	327.4	-10.4	176.89	316.5	327.4	-10.9	176.54
228.0	225.0	231.0	228.0	338.0	340.3	-2.3	182.59	338.0	340.3	-2.3	182.59
240.0	234.0	243.0	238.5	358.3	357.4	.9	184.84	358.4	357.4	1.0	184.91
249.0	246.0	252.0	249.0	379.2	370.1	9.1	190.61	379.7	370.1	9.6	190.96
258.0	255.0	261.0	258.0	393.8	382.8	11.0	191.95	394.3	382.8	11.5	192.30
262.5	262.5	262.5	262.5	400.9	389.3	11.6	192.37	473.1	389.3	83.8	243.16
271.5	265.5	274.5	270.0	415.3	402.1	13.2	193.50	415.8	402.1	13.7	193.85
280.5	277.5	286.5	282.0	429.0	414.9	14.1	194.13	429.9	414.9	15.0	194.76
291.0	291.0	300.0	295.5	445.0	429.8	15.2	194.90	442.1	429.8	12.3	192.86
297.0	291.0	300.0	295.5	455.7	438.2	17.5	196.52	455.3	438.2	17.1	196.24

Note: All "inside casing" values are from the October 25, 1987 survey.

MOE - SARNIA
PRESSURE PROFILES FOR THE DEEP MONITORING WELL (MDMW-1)

Port Depth (m)	Packer Interval m (BCT)			Survey Date November 30, 1987				Survey Date February 2, 1988			
	Top	Bottom	Midpoint	Outside Casing (p.s.i.)	Inside Casing (p.s.i.)	Change in Pressure	Equivalent Fresh Water Head (mAMSL)	Outside Casing (p.s.i.)	Inside Casing (p.s.i.)	Change in Pressure	Equivalent Fresh Water Head (mAMSL)
27.0	18.0	36.0	27.0	52.4	53.7	-1.3	183.30	52.4	53.7	-1.3	183.30
42.0	39.0	45.0	42.0	66.9	75.0	-8.1	178.51	68.4	75.0	-6.6	179.57
52.5	49.5	55.5	52.5	88.2	90.0	-1.8	182.94	98.3	90.0	8.3	190.05
61.5	58.5	66.0	62.3	125.6	102.8	22.8	200.25	126.1	102.8	23.3	200.60
75.0	70.5	79.5	75.0	119.3	122.0	-2.7	182.31	124.2	122.0	2.2	185.76
82.5	82.5	85.5	84.0	120.9	132.8	-11.9	175.84	138.9	132.8	6.1	188.50
91.5	88.5	97.5	93.0	127.7	145.6	-17.9	171.62	185.8	145.6	40.2	212.49
103.5	100.5	106.5	103.5	145.0	162.6	-17.6	171.83	210.7	162.6	48.1	218.05
111.0	109.5	114.0	111.8	168.5	173.3	-4.8	180.83	233.2	173.3	59.9	226.35
123.0	117.0	126.0	121.5	234.5	190.4	44.1	215.23	263.8	190.4	73.4	235.85
132.0	129.0	135.0	132.0	238.8	203.1	35.7	209.32	253.1	203.1	50.0	219.38
141.0	138.0	144.0	141.0	252.1	216.0	36.1	209.61	252.5	216.0	36.5	209.89
153.0	148.5	156.0	152.3	257.4	233.1	24.3	201.30	259.4	233.1	26.3	202.71
162.0	159.0	165.0	162.0	259.1	246.0	13.1	193.43	258.3	246.0	12.3	192.86
174.0	168.0	177.0	172.5	254.4	263.0	-8.6	178.16	-	263.0	-	-
180.0	180.0	183.0	181.5	257.1	271.5	-14.4	174.08	257.1	271.5	-14.4	174.08
186.0	186.0	196.5	191.3	264.1	280.0	-15.9	173.02	265.7	280.0	-14.3	174.15
192.0	186.0	196.5	191.3	273.1	288.8	-15.7	173.17	273.0	288.8	-15.8	173.09
201.0	201.0	211.5	206.3	285.4	301.7	-16.3	172.74	285.7	301.7	-16.0	172.95
207.0	201.0	211.5	206.3	295.1	310.2	-15.1	173.59	295.0	310.2	-15.2	173.52
219.0	216.0	222.0	219.0	316.0	327.4	-11.4	176.19	315.0	327.4	-12.4	175.49
228.0	225.0	231.0	228.0	338.5	340.3	-1.8	182.94	337.9	340.3	-2.4	182.52
240.0	234.0	243.0	238.5	359.0	357.4	1.6	185.34	359.6	357.4	2.2	185.76
249.0	246.0	252.0	249.0	379.9	370.1	9.8	191.10	380.2	370.1	10.1	191.32
258.0	255.0	261.0	258.0	394.3	382.8	11.5	192.30	394.5	382.8	11.7	192.44
262.5	262.5	262.5	262.5	401.2	389.3	11.9	192.58	401.4	389.3	12.1	192.72
271.5	265.5	274.5	270.0	415.9	402.1	13.8	193.92	416.1	402.1	14.0	194.06
280.5	277.5	286.5	282.0	429.9	414.9	15.0	194.76	430.2	414.9	15.3	194.97
291.0	291.0	300.0	295.5	441.8	429.8	12.0	192.65	445.7	429.8	15.9	195.40
297.0	291.0	300.0	295.5	456.3	438.2	18.1	196.94	456.2	438.2	18.0	196.87

Note: All "inside casing" values are from the October 25, 1987 survey.

MOE - SARNIA

PRESSURE PROFILES FOR THE DEEP MONITORING WELL (MDMW-1)

Port Depth (m)	Packer Interval m (BCT)			Survey Date March 26, 1988				Survey Date May 30, 1988			
	Top	Bottom	Midpoint	Outside Casing (p.s.i.)	Inside Casing (p.s.i.)	Change in Pressure	Equivalent Fresh Water Head (mAMSL)	Outside Casing (p.s.i.)	Inside Casing (p.s.i.)	Change in Pressure	Equivalent Fresh Water Head (mAMSL)
27.0	18.0	36.0	27.0	51.7	53.7	-2.0	182.80	52.3	53.7	-1.4	183.23
42.0	39.0	45.0	42.0	68.9	75.0	-6.1	179.92	69.5	75.0	-5.5	180.34
52.5	49.5	55.5	52.5	103.3	90.0	13.3	193.57	104.1	90.0	14.1	194.13
61.5	58.5	66.0	62.3	125.9	102.8	23.1	200.46	125.6	102.8	22.8	200.25
75.0	70.5	79.5	75.0	126.3	122.0	4.3	187.23	127.6	122.0	5.6	188.15
82.5	82.5	85.5	84.0	161.6	132.8	28.8	204.47	163.0	132.8	30.2	205.46
91.5	88.5	97.5	93.0	205.2	145.6	59.6	226.14	210.5	145.6	64.9	229.87
103.5	100.5	106.5	103.5	226.9	162.6	64.3	229.44	233.9	162.6	71.3	234.37
111.0	109.5	114.0	111.8	248.2	173.3	74.9	236.90	256.2	173.3	82.9	242.53
123.0	117.0	126.0	121.5	276.1	190.4	85.7	244.50	282.6	190.4	92.2	249.07
132.0	129.0	135.0	132.0	263.7	203.1	60.6	226.84	266.8	203.1	63.7	229.02
141.0	138.0	144.0	141.0	250.9	216.0	34.9	208.76	253.9	216.0	37.9	210.87
153.0	148.5	156.0	152.3	257.1	233.1	24.0	201.09	256.9	233.1	23.8	200.95
162.0	159.0	165.0	162.0	256.4	246.0	10.4	191.53	255.5	246.0	9.5	190.89
174.0	168.0	177.0	172.5	255.4	263.0	-7.6	178.86	256.6	263.0	-6.4	179.71
180.0	180.0	183.0	181.5	259.7	271.5	-11.8	175.91	259.1	271.5	-12.4	175.49
186.0	186.0	196.5	191.3	266.4	280.0	-13.6	174.64	264.2	280.0	-15.8	173.09
192.0	186.0	196.5	191.3	273.5	288.8	-15.3	173.45	272.4	288.8	-16.4	172.67
201.0	201.0	211.5	206.3	286.4	301.7	-15.3	173.45	285.9	301.7	-15.8	173.09
207.0	201.0	211.5	206.3	295.6	310.2	-14.6	173.94	294.9	310.2	-15.3	173.45
219.0	216.0	222.0	219.0	315.3	327.4	-12.1	175.70	315.6	327.4	-11.8	175.91
228.0	225.0	231.0	228.0	338.2	340.3	-2.1	182.73	337.2	340.3	-3.1	182.03
240.0	234.0	243.0	238.5	359.1	357.4	1.7	185.41	359.0	357.4	1.6	185.34
249.0	246.0	252.0	249.0	380.9	370.1	10.8	191.81	380.2	370.1	10.1	191.32
258.0	255.0	261.0	258.0	-	382.8	-	-	-	382.8	-	-
262.5	262.5	262.5	262.5	-	389.3	-	-	-	389.3	-	-
271.5	265.5	274.5	270.0	-	402.1	-	-	-	402.1	-	-
280.5	277.5	286.5	282.0	-	414.9	-	-	-	414.9	-	-
291.0	291.0	300.0	295.5	-	429.8	-	-	-	429.8	-	-
297.0	291.0	300.0	295.5	-	438.2	-	-	-	438.2	-	-

Note: All "inside casing" values are from the October 25, 1987 survey.

APPENDIX K

Groundwater Chemistry

Borehole MDMW-1

INDEX FOR QA/QC SAMPLES

BOREHOLE MDMW-1

Sample Identification	Sample Description
Westbay	Distilled water rinse of 3 m section Westbay PVC well casing
MDMW-1-R1	Distilled water rinse through stainless sample cylinder and filter unit - First Sampling Round
MDMW-1-R2	Distilled water rinse through stainless sample cylinder and filter unit - Second Sampling Round
MDMW-1-R3	Distilled water rinse through stainless sample cylinder and filter unit - Third Sampling Round
MDMW-1-R4	Distilled water rinse through stainless sample cylinder and filter unit - Fourth Sampling Round

APPENDIX K1

Borehole MDMW-1
Major Ions, Metals and Selected Phenols

Analyses by:

Ontario Ministry of the Environment
Rexdale, Ontario

and

Zenon Environmental Inc.
Burlington, Ontario

Parameter (mg/l)	2nd Round 61.5 m	3rd Round 61.5 m	4th Round 61.5 m	1st Round 75 m	2nd Round 75 m	2nd Round Duplicate 75 m	3rd Round 75 m	4th Round 75 m
	Deep Monitoring Well (MDMW-1)							
Fluoride	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloride	28000	26000	21000	30000	34000	35000	36000	32000
Nitrite (as N)	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Bromide	< 80	< 80	< 80	< 80	< 80	< 80	< 80	< 80
Nitrate (as N)	19	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Phosphate (as P)	< 8.0	< 80	< 80	< 80	< 80	< 80	< 80	< 80
Sulfate	1000	1100	1200	1200	1800	1600	1500	1800
Alkalinity (as CaCO3)	130	130	130	130	150	140	130	130
Calcium	1400	1400	1500	2200	2000	2000	2000	2100
Magnesium	590	580	660	960	820	800	800	890
Sodium	10000	11000	12000	15000	15000	14000	15000	15000
Potassium	78	69	78	120	110	110	100	100
Aluminum	< 0.5	0.35	3.2	0.13	0.12	0.070	0.83	2.4
Barium	0.25	0.21	0.27	0.30	0.21	0.20	0.21	0.23
Beryllium	< 0.01	0.03	< 0.02	< 0.001	< 0.001	< 0.001	0.02	< 0.01
Boron	5.4	6.4	12	6.0	5.3	5.1	7.2	12
Cadmium	< 0.05	< 0.05	< 0.05	< 0.005	< 0.005	< 0.005	< 0.05	< 0.05
Chromium	< 0.1	< 0.1	< 0.1	0.019	0.014	0.012	< 0.1	< 0.1
Cobalt	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1
Copper	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1
Iron	< 0.1	0.12	0.50	0.23	0.073	0.062	< 0.1	< 0.1
Lead	< 0.4	< 0.4	< 0.4	< 0.04	< 0.04	< 0.04	< 0.4	< 0.4
Manganese	0.31	0.23	0.23	0.26	0.21	0.20	0.27	0.17
Molybdenum	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1
Nickel	0.40	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1
Phosphorous	60	13	10	< 0.1	12	11	10.0	< 2
Silicon	2.0	2.8	4.1	2.2	2.8	2.7	2.8	3.0
Silver	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1
Strontium	35	34	37	42	51	50	50.0	52
Sulfur	—	430	400	—	—	—	630	730
Thallium	< 0.5	< 0.5	< 0.5	< 0.05	< 0.05	< 0.5	< 0.5	< 0.5
Titanium	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1
Vanadium	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1
Zinc	< 0.1	< 0.1	< 0.1	< 0.01	0.011	0.014	< 0.1	< 0.1
Zirconium	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1

Parameter (mg/l)	Deep Monitoring Well (MDMW-1)						
	1st Round 123 m	2nd Round 123 m	3rd Round 123 m	3rd Round Duplicate 123 m	4th Round 123 m	4th Round Duplicate 123 m	1st Round 180 m
Fluoride	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloride	31000	40000	38000	38000	39000	32000	36000
Nitrite (as N)	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Bromide	< 80	< 80	< 80	< 80	< 80	< 80	< 80
Nitrate (as N)	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Phosphate (as P)	< 80	< 80	< 80	< 80	< 80	< 80	< 80
Sulfate	1600	2000	680	1800	2300	2200	1900
Alkalinity (as CaCO3)	150	250	190	200	180	180	170
Calcium	3100	2800	2700	2700	3000	2900	3400
Magnesium	1200	1000	1100	1100	1300	1200	1300
Sodium	15000	15000	15000	15000	17000	17000	15000
Potassium	110	140	130	130	140	140	180
Aluminum	0.12	0.22	0.78	2.3	3.2	2.9	0.25
Barium	0.30	0.29	0.34	0.35	0.35	0.34	0.28
Beryllium	< 0.001	< 0.001	< 0.01	< 0.01	< 0.02	< 0.02	< 0.001
Boron	8.8	8.1	11	13	17	18	11
Cadmium	< 0.005	< 0.005	< 0.05	< 0.05	< 0.05	< 0.05	< 0.005
Chromium	0.020	0.015	< 0.1	< 0.1	< 0.1	< 0.1	0.10
Cobalt	< 0.01	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01
Copper	< 0.01	< 0.01	< 0.1	< 0.1	0.56	0.37	< 0.01
Iron	0.38	0.15	< 0.1	< 0.1	< 0.1	< 0.1	0.11
Lead	< 0.04	< 0.04	< 0.4	< 0.4	< 0.4	< 0.4	< 0.04
Manganese	0.35	0.59	0.46	0.47	0.59	0.55	0.35
Molybdenum	< 0.01	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01
Nickel	< 0.01	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01
Phosphorous	< 0.1	13	11	11	11	9.0	< 0.1
Silicon	2.2	2.8	2.8	3.3	3.9	3.8	2.1
Silver	< 0.01	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01
Strontium	52	64	64	64	72	69	59
Sulfur	—	—	1900	2100	2000	1900	—
Thallium	< 0.05	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.05
Titanium	< 0.01	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01
Vanadium	< 0.01	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01
Zinc	0.024	0.017	< 0.1	< 0.1	< 0.1	< 0.1	0.021
Zirconium	< 0.01	< 0.01	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01

	Deep Monitoring Well (MDMW-1)							
Parameter (mg/l)	1st Round 192 m	2nd Round 192 m	3rd Round 192 m	4th Round 192 m	1st Round 207 m	2nd Round 207 m	3rd Round 207 m	4th Round 207 m
Fluoride	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloride	44000	34000	32000	28000	93000	56000	38000	37000
Nitrite (as N)	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Bromide	< 80	< 80	< 80	< 80	< 80	< 80	110	< 80
Nitrate (as N)	< 20	< 20	< 20	< 20	20	< 20	< 20	< 20
Phosphate (as P)	< 80	< 80	< 80	< 80	< 80	< 80	< 80	< 80
Sulfate	3100	3900	3700	4000	120	1900	2200	2600
Alkalinity (as CaCO3)	640	860	720	830	190	380	430	440
Calcium	2700	1800	1700	1900	13000	5000	4200	4100
Magnesium	1300	910	880	980	4400	1600	1700	1600
Sodium	18000	17000	16000	16000	37000	19000	18000	20000
Potassium	210	110	110	120	1000	370	290	280
Aluminum	0.10	0.058	1.2	2.9	0.16	0.10	1.7	3.4
Barium	0.026	0.016	0.02	0.071	0.026	0.017	0.01	0.053
Beryllium	< 0.001	< 0.001	< 0.01	< 0.02	< 0.001	< 0.001	< 0.01	< 0.02
Boron	12	15	14	20	25	22	19	28
Cadmium	< 0.005	< 0.005	< 0.05	< 0.05	< 0.005	< 0.005	< 0.05	< 0.05
Chromium	0.14	< 0.01	< 0.1	< 0.1	0.13	0.29	0.37	< 0.1
Cobalt	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	< 0.1	< 0.1
Copper	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	< 0.1	< 0.1
Iron	0.20	< 0.01	< 0.1	0.31	0.10	0.091	0.18	< 0.1
Lead	< 0.04	< 0.04	< 0.4	< 0.4	< 0.04	< 0.04	< 0.4	< 0.4
Manganese	0.043	0.015	< 0.05	< 0.05	0.071	0.084	0.14	< 0.05
Molybdenum	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	< 0.1	< 0.1
Nickel	< 0.01	< 0.01	< 0.1	< 0.1	0.018	0.016	< 0.1	< 0.1
Phosphorous	< 0.1	1.5	2.6	6.3	7.0	11	7.4	4.3
Silicon	1.6	1.7	1.7	2.8	1.4	2.3	2.4	3.3
Silver	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	< 0.1	< 0.1
Strontium	43	39	37	41	150	98	83	82
Sulfur	—	—	11000	5300	—	—	5000	5900
Thallium	< 0.05	< 0.5	< 0.5	< 0.5	< 0.05	< 0.5	< 0.5	< 0.5
Titanium	< 0.01	< 0.01	< 0.1	< 0.1	0.052	< 0.01	< 0.1	< 0.1
Vanadium	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	< 0.1	< 0.1
Zinc	0.032	0.13	< 0.1	< 0.1	0.037	0.014	< 0.1	< 0.1
Zirconium	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	< 0.1	< 0.1

Parameter (mg/l)	Deep Monitoring Well (MDMW-1)					
	3rd Round 228 m	4th Round 228 m	1st Round 240 m	4th Round 240 m	1st Round 271.5 m	1st Round 291 m
Fluoride	< 10	< 10	< 10	< 10	< 10	< 10
Chloride	120000	120000	120000	160000	130000	120000
Nitrite (as N)	< 20	< 20	< 20	< 20	< 20	< 20
Bromide	410	< 80	< 80	< 80	< 80	< 80
Nitrate (as N)	< 20	< 20	16	< 20	16	14
Phosphate (as P)	< 80	< 80	< 80	< 80	< 80	< 80
Sulfate	1500	1800	88	1000	79	79
Alkalinity (as CaCO3)	420	410	190	240	210	240
Calcium	5900	6800	14000	16000	18000	16000
Magnesium	2500	2800	4400	4800	5800	5400
Sodium	51000	64000	47000	54000	46000	43000
Potassium	570	600	1300	1300	1300	1300
Aluminum	0.95	3.0	0.19	2.6	0.22	0.19
Barium	0.01	< 0.1	0.005	< 0.02	0.017	0.039
Beryllium	< 0.01	0.063	< 0.001	< 0.01	< 0.001	< 0.001
Boron	62	100	35	91	28	28
Cadmium	< 0.05	< 0.05	< 0.005	< 0.05	< 0.005	< 0.005
Chromium	< 0.1	< 0.1	0.026	< 0.1	0.027	0.015
Cobalt	< 0.1	< 0.1	< 0.01	< 0.1	< 0.01	< 0.01
Copper	< 0.1	< 0.1	< 0.01	< 0.1	< 0.01	< 0.01
Iron	0.93	< 0.1	< 0.01	< 0.1	< 0.01	< 0.01
Lead	< 0.04	< 0.4	< 0.04	< 0.4	< 0.04	< 0.04
Manganese	< 0.05	< 0.05	0.010	< 0.05	0.023	0.034
Molybdenum	< 0.1	< 0.1	< 0.01	< 0.1	< 0.01	< 0.01
Nickel	0.18	< 0.1	0.022	< 0.1	< 0.01	< 0.01
Phosphorous	2.3	< 2	4.1	< 2	2.4	3.5
Silicon	2.1	2.9	1.1	1.5	1.1	1.2
Silver	< 0.1	< 0.1	< 0.01	< 0.1	< 0.01	< 0.01
Strontium	120	130	160	310	180	180
Sulfur	7900	12000	—	1400	—	—
Thallium	< 0.5	< 0.5	< 0.05	< 0.5	< 0.05	< 0.05
Titanium	< 0.1	< 0.1	0.043	< 0.1	0.052	0.053
Vanadium	< 0.1	< 0.1	< 0.01	< 0.1	< 0.01	< 0.01
Zinc	< 0.1	< 0.1	0.013	< 0.1	0.017	0.021
Zirconium	< 0.1	< 0.1	< 0.01	< 0.1	< 0.01	< 0.01

Parameter (mg/l)	Deep Monitoring Well (MDMW-1) 1st Equipment Rinse	2nd Equipment Rinse	3rd Equipment Rinse	4th Equipment Rinse
Fluoride	< 0.1	< 0.1	< 0.1	< 0.1
Chloride	< 0.2	< 0.2	< 0.2	< 0.2
Nitrite (as N)	< 0.2	< 0.2	< 0.2	< 0.2
Bromide	< 0.8	< 0.8	< 0.8	< 0.8
Nitrate (as N)	< 0.2	< 0.2	< 0.2	< 0.2
Phosphate (as-P)	< 0.8	< 0.8	< 0.8	< 0.8
Sulfate	< 1.0	< 1.0	< 1.0	< 1.0
Alkalinity (as CaCO3)	< 1	< 1	< 1	< 1
Calcium	0.18	0.14	0.047	< 0.2
Magnesium	0.034	0.025	0.023	< 0.05
Sodium	0.73	0.28	0.89	< 1
Potassium	< 0.4	< 0.4	< 0.4	< 0.5
Aluminum	0.15	< 0.03	< 0.03	0.17
Barium	0.0185	0.002	0.001	< 0.002
Beryllium	< 0.001	< 0.001	< 0.001	< 0.0003
Boron	0.23	0.011	0.23	0.34
Cadmium	< 0.005	< 0.005	< 0.005	< 0.006
Chromium	< 0.01	< 0.01	< 0.01	0.096
Cobalt	< 0.01	< 0.01	< 0.01	< 0.01
Copper	< 0.01	< 0.01	< 0.01	< 0.01
Iron	0.065	0.047	< 0.01	0.41
Lead	< 0.04	< 0.04	< 0.04	< 0.04
Manganese	< 0.005	< 0.005	< 0.005	< 0.01
Molybdenum	< 0.01	< 0.01	< 0.01	< 0.02
Nickel	< 0.01	< 0.01	< 0.01	0.06
Phosphorous	< 0.1	< 0.1	< 0.1	< 0.1
Silicon	0.092	0.25	< 0.05	0.15
Silver	< 0.01	< 0.01	< 0.01	< 0.01
Strontium	< 0.001	0.002	3.7	< 0.005
Sulfur	—	—	7.0	< 0.2
Thallium	< 0.05	< 0.05	< 0.05	< 0.05
Titanium	< 0.01	< 0.01	< 0.01	< 0.01
Vanadium	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	0.082	0.029	< 0.01	< 0.01
Zirconium	< 0.01	< 0.01	< 0.01	< 0.01

Parameter (mg·L^{-1})	Westbay Casing Rinse	City of Sarnia Water	During Drilling MDHLS-1 229.8-254.2m	During Drilling MDHLS-2 247.5-260.3m	Flare Line Discharge MD-1 196.3m	Drill Water Return MDMW-1-DWR 165.9m
COPPER, UNF.TOTAL. CUUT ,MG/L as Cu (Copper) 522AE2	<.001<	.001	<.10<	<.10<	+	<.001<
NICKEL, UNF.TOTAL NIUT ,MG/L as Ni (Nickel) 522AE2	.042	.011	<.10<	<.10<	+	.002
LEAD, UNF.TOTAL PBUT ,MG/L as Pb (Lead) 522AE2	<.003<	<.003<	<.40<	<.40<	+	<.003<
ZINC, UNF.TOTAL ZNUT ,MG/L as Zn (Zinc) 522AE2	.034	<.001<	<.10<	<.10<	+	<.002<
MANGANESE, UNF.TOTAL MNUT ,MG/L as Mn Manganese 522AE2	.034	..031	.18	.76	+	.042
ARSENIC, UNF.TOTAL ASUT ,MG/L as As (Arsenic) 540AF3	.012	.014	—	—	.011	<.001<
CADMIUM, UNF.TOTAL CDUT ,MG/L as Cd (Cadmium) 522AE2	<.0003<	<.0003<	<.010<	<.010<	+	<.0003<
COBALT, UNF. TOTAL COUT ,MG/L as Co (Cobalt) 522AE2	.025	.025	<.10<	<.10<	+	.001
CHROMIUM, UNF.TOTAL CRUT ,MG/L as Cr (Chromium) 522AE2	.050	.013	<.10<	.38	+	.001
MOLYBDENUM, UNF.TOTAL MOUT ,MG/L as Mo Molybdenum 522AE2	.011	.007	.07	.18	+	.010
SELENIUM, UNF.TOTAL SEUT ,MG/L as Se (Selenium) 540AF3	<.001<	<.001<	—	—	<.001<	<.001<
STRONTIUM, UNF. TOTAL SRUT ,MG/L as Sr Strontium 522AE2	2.100	1.900	13.00	270.00	+	.310
VANADIUM,UNF,TOTAL VVUT ,MG/L as V (Vanadium) 522AE2	<.001<	<.001<	<.10<	1.20	+	<.001<
CYANIDE, FREE,UNF.REACT. CCNFUR,MG/L as CN (Cyanide) 306AC2	—	—	<.001<W	.019	—	—

+ Not reported

— Analysis [illegible] performed

MOE - SARNIA
DEEP MONITORING WELL
QA/QC and Samples Taken During Drilling

Parameter (mg/L)	Westbay Casing Rinse	City of Sarnia Water	During Drilling MDMLS-1 229.8-254.2m	During Drilling MDMLS-2 247.5-260.3m	Flare Line Discharge MD-1 196.3m	Drill Water Return MDMW-1-DWR 165.9m
pH	7.94*	7.93	7.62	5.96	8.2	8.02*
Conductivity (umhos)	-	-	-	-	2490	-
Alkalinity (as CaCO3)	.01	72	+	+	+	180
Chloride	.17	6.8	3935	246640	57156	446
Fluoride	<0.1	1.1	.9	.3	2.3	1.3
Ammonia (as N)	.06	<0.005	+	+	+	.58
Nitrate (as N)	.3	.5	+	+	+	1.8
Sulphate	<0.5	21	3000	1200	5150	93
Phenols (ug/L)	<1.0	<1.0	+	+	+	-
Calcium	2.4	27	+	+	+	30
Magnesium	.5	7.3	+	+	+	8.1
Calculated Hardness	8	97	+	+	+	108
Sodium	.4	3	+	+	+	300
Potassium	.1	.9	+	+	+	24.6
Iron	.01	.91	+	+	+	.16
Manganese	<0.001	.012	+	+	+	.05

* Laboratory measurement
+ Not reported
- Analysis not performed

APPENDIX K2

Borehole MDMW-1
Volatile Organics

Analyses by:

Barringer-Magenta Ltd.
Rexdale, Ontario

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MD-1 1ST QTR DF=10	MDMLS-2 1ST QTR	1-61.5M 2ND QTR DF=100	1-61.5M 4TH QTR DF=100	1-75M 1ST QTR DF=100	1-75M 2ND QTR DF=100	1-75M 3RD QTR DF=100
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	2220.0	32.1	ND	ND	ND	ND	ND
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	5.8	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	69.0	ND	ND	97.0	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	14.5	322.0	490.0	544.0	365.0	520.0
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	1360.0	24.2	318.0	492.0	444.0	198.0	370.0
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	147.0	3.3	57.0	47.3	136.0	127.0	60.0
34	M-XYLENE & P-XYLENE	.5	547.0	24.7	278.0	271.0	218.0	135.0	298.0
35	O-XYLENE	.5	257.0	8.6	150.0	137.0	119.0	81.0	131.0
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	26.9	0.6	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	69.5	0.7	ND	ND	ND	ND	ND

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ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.
M = MERGED COMPOUNDS

VOLATILE ORGANICS RESULTS (CONT'D)

	COMPOUND	M.D.L. UG/L	MD-1 1ST QTR DF=10	MDMLS-2 1ST QTR	1-61.5M 2ND QTR DF=100	1-61.5M 4TH QTR DF=100	1-75M 1ST QTR DF=100	1-75M 2ND QTR DF=100	1-75M 3RD QTR DF=100
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	M141.0	5.8	32.0	33.2	48.0	#15.0	29.0
43	1,3,5-TRIMETHYLBENZENE	.2	M116.0	ND	21.0	#19.9	ND	#10.0	ND
44	1-ETHYL-2-METHYLBENZENE	.2	30.0	1.1	ND	#10.4	ND	ND	ND
45	1,2,4-TRIMETHYLBENZENE	.2	127.0	10.5	75.0	ND	61.0	38.0	65.0
46	PENTACHLOROETHANE	1.0	ND	ND	ND	74.9	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	62.1	3.8	39.0	ND	34.0	21.0	31.0
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	39.1	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	26.9	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	20.0	0.6	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	95%	963%	76%	135%	101%	90%	95%
58	1,4-DICHLOROBUTANE	10 UG/L	139%	164%	99%	120%	103%	101%	92%
59	4-BROMOFLUOROBENZENE	2 UG/L	106%	113%	96%	110%	93%	99%	80%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-75M 4TH QTR DF=100	1-123M 1ST QTR DF=100	1-123M 2ND QTR DF=100	1-123M 3RD QTR DF=100	1-123M 4TH QTR DF=100	1-123M DUP 4TH QTR DF=100	1-180M 1ST QTR DF=100
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	55.0	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	521.0	795.0	551.0	622.0	622.0	961.0	432.0
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	463.0	650.0	267.0	410.0	469.0	654.0	195.0
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	54.9	52.0	#129.0	#138.0	44.3	47.4	#11.0
34	M-XYLENE & P-XYLENE	.5	311.0	295.0	132.0	231.0	240.0	264.0	58.0
35	O-XYLENE	.5	148.0	160.0	80.0	104.0	118.0	137.0	#40.0
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D)   ND = NOT DETECTED   * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-75M 4TH QTR DF=100	1-123M 1ST QTR DF=100	1-123M 2ND QTR DF=100	1-123M 3RD QTR DF=100	1-123M 4TH QTR DF=100	1-123M DUP 4TH QTR DF=100
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	33.6	57.0	*12.0	20.0	24.5	25.1
43	1,3,5-TRIMETHYLBENZENE	.2	*19.6	ND	ND	ND	*14.5	*14.5
44	1-ETHYL-2-METHYLBENZENE	.2	*11.1	*11.0	ND	ND	*7.4	*8.6
45	1,2,4-TRIMETHYLBENZENE	.2	ND	70.0	32.0	46.0	ND	ND
46	PENTACHLOROETHANE	1.0	76.6	ND	ND	ND	56.9	60.4
47	1.3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
48	1.2,3-TRIMETHYLBENZENE	.2	ND	38.0	20.0	25.0	ND	ND
49	1,4-DICHLOROBENZENE	.5	38.1	ND	ND	ND	28.6	33.2
50	1.3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND
55	1,2.4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1.3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT						
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	112%	101%	83%	98%	110%	121%
58	1,4-DICHLOROBUTANE	10 UG/L	103%	103%	96%	88%	105%	112%
59	4-BROMOFLUOROBENZENE	2 UG/L	89%	93%	101%	67%	95%	118%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-180M 2ND QTR DF=100	1-192.5M 1ST QTR DF=100	1-192M 2ND QTR DF=100	1-192.5M 3RD QTR DF=100	1-192M 4TH QTR DF=100	1-207M 1ST QTR DF=25	1-207M RPT 1ST QTR DF=25
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	661.0	646.0	952.0	1580.0	647.0	51.1	54.4
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	285.0	563.0	160.0	5880.0	440.0	87.9	58.9
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	51.0	821.0	123.0	1630.0	60.5	15.7	85.7
34	M-XYLENE & P-XYLENE	.5	219.0	82.0	324.0	4470.0	158.0	95.5	29.5
35	O-XYLENE	.5	120.0	66.0	224.0	2190.0	84.6	41.0	20.4
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	ND	ND	50.0	29.6	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	ND	ND	195.0	116.0	82.7	ND

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VOLATILE ORGANICS RESULTS (CONT'D)   ND = NOT DETECTED   # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-180M 2ND QTR DF=100	1-192.5M 1ST QTR DF=100	1-192M 2ND QTR DF=100	1-192.5M 3RD QTR DF=100	1-192M 4TH QTR DF=100	1-207M 1ST QTR DF=25	1-207M RP 1ST QTR DF=25
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	31.0	ND	24.0	550.0	430.0	24.0	8.8
43	1,3,5-TRIMETHYLBENZENE	.2	20.0	#13.0	20.0	256.0	149.0	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	#12.0	ND	#13.0	282.0	154.0	#3.9	ND
45	1,2,4-TRIMETHYLBENZENE	.2	66.0	#13.0	44.0	742.0	ND	28.2	12.1
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	32.0	ND	22.0	ND	470.0	14.1	7.9
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	#13.7	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	148.0	61.6	#3.0	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	148%	116%	143%	104%	152%	119%	115%
58	1,4-DICHLOROBUTANE	10 UG/L	98%	109%	96%	98%	133%	125%	128%
59	4-BROMOFLUOROBENZENE	2 UG/L	102%	90%	100%	105%	151%	108%	102%

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VOLATILE ORGANICS RESULTS　　ND = NOT DETECTED　　* = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. US/L	1-207M 2ND QTR DF=10	1-207M 3RD QTR DF=25	1-207M 4TH QTR DF=25	1-228M 3RD QTR DF=25	1-228M 4TH QTR DF=25	1-240M 1ST QTR DF=10	1-240M 2ND QTR DF=5
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	ND	39.2	52.4	194.0	262.0	19.3	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	ND	66.2	223.0	22.2	49.2	117.0	ND
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	ND	31.3	26.6	*5.7	*5.6	11.8	ND
34	M-XYLENE & P-XYLENE	.5	ND	157.0	145.0	32.8	31.2	47.9	ND
35	O-XYLENE	.5	ND	68.0	65.4	19.2	20.6	26.9	ND
36	STYRENE	.5	ND	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	ND	5.0	5.6	ND	ND	*1.4	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	ND	7.0	6.7	ND	ND	*1.8	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-207M 2ND QTR DF=10	1-207M 3RD QTR DF=25	1-207M 4TH QTR DF=25	1-228M 3RD QTR DF=25	1-228M 4TH QTR DF=25	1-240M 1ST QTR DF=10	1-240M 2ND QTR DF=5
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	ND	32.1	34.0	*4.7	5.3	9.2	ND
43	1,3,5-TRIMETHYLBENZENE	.2	ND	20.0	22.4	*2.6	*3.0	5.7	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND	10.8	10.8	*2.0	*2.1	*2.8	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND	70.0	73.9	10.6	11.5	20.4	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND	31.1	35.6	5.2	6.9	11.8	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	7.7	7.2	ND	ND	*1.9	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	93%	96%	150%	93%	132%	--	98%
58	1,4-DICHLOROBUTANE	10 UG/L	96%	109%	167%	107%	103%	--	111%
59	4-BROMOFLUOROBENZENE	2 UG/L	89%	99%	146%	79%	116%	--	94%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-240M 4TH QTR DF=25	1-271.5M 1ST QTR DF=5	1-271M 2ND QTR DF=5	1-271M RPT 2ND QTR DF=100	1-291M 1ST QTR DF=10	1-291M 2ND QTR DF=5
1	CHLOROMETHANE	5.0	ND	ND	ND	ND	ND	ND
2	VINYL CHLORIDE	5.0	ND	ND	ND	ND	ND	ND
3	CHLOROETHANE	5.0	ND	ND	ND	ND	ND	ND
4	TRICHLOROFLUOROMETHANE	2.0	ND	ND	ND	ND	ND	ND
5	BROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND
6	ACROLEIN	25.0	ND	ND	ND	ND	ND	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND	ND	ND	ND	ND	ND
8	1,1-DICHLOROETHENE	1.0	ND	ND	ND	ND	ND	ND
9	DICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND
10	ACRYLONITRILE	10.0	ND	ND	ND	ND	ND	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND
12	1,1-DICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND
14	CHLOROFORM	.5	ND	ND	ND	ND	ND	ND
15	1,1,1-TRICHLOROETHANE	.5	ND	ND	ND	ND	ND	ND
16	CARBON TETRACHLORIDE	.5	ND	ND	ND	ND	ND	ND
17	BENZENE	.5	26.7	7.0	ND	ND	61.7	ND
18	1,2-DICHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND
19	TRICHLOROETHENE	.5	ND	ND	ND	ND	ND	ND
20	1,2-DICHLOROPROPANE	1.0	ND	ND	ND	ND	ND	ND
21	BROMODICHLOROMETHANE	1.0	ND	ND	ND	ND	ND	ND
22	DIBROMOMETHANE	2.0	ND	ND	ND	ND	ND	ND
23	DICHLOROACETONITRILE	15.0	ND	ND	ND	ND	ND	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND
26	TOLUENE	.5	539.0	14.5	ND	ND	78.6	ND
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND	ND	ND	ND	ND	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND
29	TETRACHLOROETHENE	.5	ND	ND	ND	ND	ND	ND
30	DIBROMOCHLOROMETHANE	2.0	ND	ND	ND	ND	ND	ND
31	1,2-DIBROMOETHANE	2.0	ND	ND	ND	ND	ND	ND
32	CHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
33	ETHYLBENZENE	.5	44.5	*1.9	ND	ND	6.4	ND
34	M-XYLENE & P-XYLENE	.5	66.1	11.2	ND	ND	35.0	ND
35	O-XYLENE	.5	43.4	6.7	ND	ND	21.0	ND
36	STYRENE	.5	ND	ND	ND	ND	ND	ND
37	ISOPROPYLBENZENE	.2	*2.5	ND	ND	ND	ND	ND
38	BROMOFORM	2.0	ND	ND	ND	ND	ND	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND
40	PROPYLBENZENE	.2	*2.6	ND	ND	ND	ND	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-240M 4TH QTR DF=25	1-271.5M 1ST QTR DF=5	1-271M 2ND QTR DF=5	1-271M RPT 2ND QTR DF=100	1-291M 1ST QTR DF=10	1-291M 2ND QTR DF=5
41	BROMOBENZENE	1.0	ND	ND	ND	ND	ND	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	8.8	1.3	ND	ND	6.7	ND
43	1,3,5-TRIMETHYLBENZENE	.2	#4.9	#.8	ND	ND	ND	ND
44	1-ETHYL-2-METHYLBENZENE	.2	#3.5	ND	ND	ND	#1.3	ND
45	1,2,4-TRIMETHYLBENZENE	.2	19.1	3.0	ND	ND	8.8	ND
46	PENTACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND
47	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
48	1,2,3-TRIMETHYLBENZENE	.2	10.0	2.0	ND	ND	5.1	ND
49	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
50	1,3-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND
51	1,4-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND
52	1,2-DIETHYLBENZENE	.2	ND	ND	ND	ND	ND	ND
53	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
54	HEXACHLOROETHANE	1.0	ND	ND	ND	ND	ND	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT						
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	140%	115%	58%	91%	108%	64%
58	1,4-DICHLOROBUTANE	10 UG/L	112%	125%	99%	110%	119%	109%
59	4-BROMOFLUOROBENZENE	2 UG/L	129%	101%	88%	103%	100%	90%

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VOLATILE ORGANICS RESULTS ND = NOT DETECTED $ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	WESTBAY 1ST QTR DBH QA/QC
1	CHLOROMETHANE	5.0	ND
2	VINYL CHLORIDE	5.0	ND
3	CHLOROETHANE	5.0	ND
4	TRICHLOROFLUOROMETHANE	2.0	6.0
5	BROMOMETHANE	2.0	ND
6	ACROLEIN	25.0	ND
7	1,1,2-TRICHLOROTRIFLUOROETHANE	2.0	ND
8	1,1-DICHLOROETHENE	1.0	ND
9	DICHLOROMETHANE	1.0	712.0
10	ACRYLONITRILE	10.0	ND
11	TRANS-1,2-DICHLOROETHENE	.5	ND
12	1,1-DICHLOROETHANE	.5	ND
13	CIS-1,2-DICHLOROETHENE	.5	ND
14	CHLOROFORM	.5	ND
15	1,1,1-TRICHLOROETHANE	.5	ND
16	CARBON TETRACHLORIDE	.5	ND
17	BENZENE	.5	ND
18	1,2-DICHLOROETHANE	1.0	ND
19	TRICHLOROETHENE	.5	ND
20	1,2-DICHLOROPROPANE	1.0	ND
21	BROMODICHLOROMETHANE	1.0	ND
22	DIBROMOMETHANE	2.0	ND
23	DICHLOROACETONITRILE	15.0	ND
24	1-BROMO-2-CHLOROETHANE	2.0	ND
25	CIS-1,3-DICHLOROPROPENE	1.0	ND
26	TOLUENE	.5	$.4
27	TRANS-1,3-DICHLOROPROPENE	1.0	ND
28	1,1,2-TRICHLOROETHANE	2.0	ND
29	TETRACHLOROETHENE	.5	ND
30	DIBROMOCHLOROMETHANE	2.0	ND
31	1,2-DIBROMOETHANE	2.0	ND
32	CHLOROBENZENE	.5	ND
33	ETHYLBENZENE	.5	ND
34	M-XYLENE & P-XYLENE	.5	$.2
35	O-XYLENE	.5	$.1
36	STYRENE	.5	$.3
37	ISOPROPYLBENZENE	.2	ND
38	BROMOFORM	2.0	ND
39	1,1,2,2-TETRACHLOROETHANE	2.0	ND
40	PROPYLBENZENE	.2	ND

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VOLATILE ORGANICS RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	WESTBAY 1ST QTR DBH QA/QC
41	BROMOBENZENE	1.0	ND
42	1-ETHYL-3&4-METHYLBENZENE	.2	*.1
43	1,3,5-TRIMETHYLBENZENE	.2	ND
44	1-ETHYL-2-METHYLBENZENE	.2	ND
45	1,2,4-TRIMETHYLBENZENE	.2	ND
46	PENTACHLOROETHANE	1.0	ND
47	1,3-DICHLOROBENZENE	.5	ND
48	1,2,3-TRIMETHYLBENZENE	.2	ND
49	1,4-DICHLOROBENZENE	.5	ND
50	1,3-DIETHYLBENZENE	.2	ND
51	1,4-DIETHYLBENZENE	.2	ND
52	1,2-DIETHYLBENZENE	.2	ND
53	1,2-DICHLOROBENZENE	.5	ND
54	HEXACHLOROETHANE	1.0	ND
55	1,2,4-TRICHLOROBENZENE	1.0	ND
56	HEXACHLORO-1,3-BUTADIENE	.5	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT	
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	96%
58	1,4-DICHLOROBUTANE	10 UG/L	95%
59	4-BROMOFLUOROBENZENE	2 UG/L	95%

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SPIKED VOLATILE SAMPLES - PERCENT RECOVERIES

	COMPOUND	AMOUNT US/L	1-75M 1ST QTR	1-240M 4TH QTR	1-291M 2ND QTR
1	CHLOROMETHANE	20.0	169	58	98
2	VINYL CHLORIDE	20.0	148	94	119
3	CHLOROETHANE	20.0	191	74	71
4	TRICHLOROFLUOROMETHANE	5.0	76	47	91
5	BROMOMETHANE	20.0	179	102	99
6	ACROLEIN	21.0	0	29	55
7	1,1,2-TRICHLOROTRIFLUOROETHANE	5.0	164	115	123
8	1,1-DICHLOROETHENE	5.0	321	99	108
9	DICHLOROMETHANE	5.0	49	76	89
10	ACRYLONITRILE	30.2	85	101	99
11	TRANS-1,2-DICHLOROETHENE	5.0	105	116	95
12	1,1-DICHLOROETHANE	5.0	139	113	96
13	CIS-1,2-DICHLOROETHENE	5.0	87	119	78
14	CHLOROFORM	5.0	118	119	98
15	1,1,1-TRICHLOROETHANE	5.0	122	136	93
16	CARBON TETRACHLORIDE	5.0	129	110	93
17	BENZENE	5.0	87	131	102
18	1,2-DICHLOROETHANE	5.0	110	121	98
19	TRICHLOROETHENE	5.0	127	139	96
20	1,2-DICHLOROPROPANE	5.0	146	128	109
21	BROMODICHLOROMETHANE	5.0	115	115	86
22	DIBROMOMETHANE	6.1	113	132	102
23	DICHLOROACETONITRILE	27.4	112		44
24	1-BROMO-2-CHLOROETHANE	5.9	128	116	99
25	CIS-1,3-DICHLOROPROPENE	6.2	116	105	108
26	TOLUENE	5.0	97	646	92
27	TRANS-1,3-DICHLOROPROPENE	3.8	125	41	95
28	1,1,2-TRICHLOROETHANE	5.0	124	132	97
29	TETRACHLOROETHENE	5.0	115	137	91
30	DIBROMOCHLOROMETHANE	5.0	94	88	87
31	1,2-DIBROMOETHANE	6.0	96	114	88
32	CHLOROBENZENE	5.0	91	121	85
33	ETHYLBENZENE	5.0	85	158	83
34	M-XYLENE & P-XYLENE	1.5	19	302	92
35	O-XYLENE	2.0	14	244	97
36	STYRENE	2.0	101	127	90
37	ISOPROPYLBENZENE	2.0	91	118	84
38	BROMOFORM	5.0	89	60	85
39	1,1,2,2-TETRACHLOROETHANE	5.0	98	136	93
40	PROPYLBENZENE	1.9	93	115	86

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SPIKED VOLATILE SAMPLES - PERCENT RECOVERIES (CONTINUED)

	COMPOUND	AMOUNT UG/L	1-75M 1ST QTR	1-240M 4TH QTR	1-291M 2ND QTR
41	BROMOBENZENE	3.4	90	124	84
42	1-ETHYL-3&4-METHYLBENZENE	1.9	71	141	86
43	1,3,5-TRIMETHYLBENZENE	2.0	107	133	87
44	1-ETHYL-2-METHYLBENZENE	2.0	100	124	85
45	1,2,4-TRIMETHYLBENZENE	1.9	86	157	85
46	PENTACHLOROETHANE	2.9	105	69	90
47	1,3-DICHLOROBENZENE	2.5	97	124	86
48	1,2,3-TRIMETHYLBENZENE	2.0	94	172	87
49	1,4-DICHLOROBENZENE	2.9	94	123	88
50	1,3-DIETHYLBENZENE	2.0	95	118	84
51	1,4-DIETHYLBENZENE	1.9	103	122	88
52	1,2-DIETHYLBENZENE	1.9	97	126	86
53	1,2-DICHLOROBENZENE	3.0	93	118	89
54	HEXACHLOROETHANE	2.5	138	14	76
55	1,2,4-TRICHLOROBENZENE	3.0	104	129	89
56	HEXACHLORO-1,3-BUTADIENE	2.0	92	126	85
	SURROGATE STANDARD RECOVERIES:	AMOUNT			
57	1-CHLORO-2-BROMOPROPANE	10 UG/L	127	134	100
58	1,4-DICHLOROBUTANE	10 UG/L	129	103	117
59	4-BROMOFLUOROBENZENE	2 UG/L	111	125	111

APPENDIX K3

Borehole MDMW-1
Base Neutral Extractables

Analyses by:

Barringer-Magenta Ltd.
Rexdale, Ontario

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MD-1 1ST QTR DF=4	MDMLS-1 1ST QTR	MDMLS-2 1ST QTR	MDMLS-2 1ST QTR QC-REPEAT	1-61.5M 2ND QTR DF=1.6	1-61.5M 3RD QTR	1-61.5M 4TH QTR DF=1.6
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	262.0	7.2	0.9	1.1	16.7	6.2	4.9
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	‡.4
14	2-METHYLNAPHTHALENE	.5	199.0	2.4	0.6	0.7	11.5	4.7	2.9
15	1-METHYLNAPHTHALENE	.5	155.0	3.5	0.6	0.5	9.2	3.7	2.1
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2.6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	6.8	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	1.3	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	0.5	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	13.3	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	5.8	2.0	3.1	3.2	1.1	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	ND	ND	6.8	2.8	ND	ND	ND

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BASE-NEUTRAL RESULTS (CONT'D)

ND = NOT DETECTED   # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

COMPOUND	M.D.L. UG/L	MD-1 1ST QTR DF=4	MDMLS-1 1ST QTR	MDMLS-2 1ST QTR	MDMLS-2 1ST QTR QC-REPEAT	1-61.5M 2ND QTR DF=1.6	1-61.5M 3RD QTR	1-61.5M 4TH QTR DF=1.6
41 DI-N-OCTYL PHTHALATE	1.0	ND	ND	3.2	1.6	ND	ND	ND
42 BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43 BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44 BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45 INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46 DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47 BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:	AMOUNT							
48 NITROBENZENE-D5	50 UG/L	14%	26%	28%	31%	113%	44%	49%
49 2-FLUOROBIPHENYL	50 UG/L	34%	55%	52%	55%	85%	36%	56%
50 4-TERPHENYL-D14	50 UG/L	47%	51%	90%	99%	49%	107%	44%

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BASE-NEUTRAL EXTRACTABLES RESULTS   ND = NOT DETECTED   * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-75M 1ST QTR DF=100	1-75M 2ND QTR DF=16	1-75M DUPL 2ND QTR DF=10	1-75M 3RD QTR	1-75M 4TH QTR DF=1.6	1-123M 1ST QTR DF=100	1-123M 2ND QTR DF=16
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	8.6	8.2	5.7	5.4	ND	*6.0
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	*6.4	6.2	4.2	2.7	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	*4.7	*4.8	3.1	1.9	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	1.3	ND	*.2	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	1.1	ND	ND	ND	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.[illegible]	ND	ND	ND	ND	ND	ND	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-75M 1ST QTR DF=100	1-75M 2ND QTR DF=16	1-75M DUPL 2ND QTR DF=10	1-75M 3RD QTR	1-75M 4TH QTR DF=1.6	1-123M 1ST QTR DF=100	1-123M 2ND QTR DF=16
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT							
48	NITROBENZENE-D5	50 UG/L	--	--	--	54%	55%	--	--
49	2-FLUOROBIPHENYL	50 UG/L	--	--	--	32%	47%	--	--
50	4-TERPHENYL-D14	50 UG/L	--	--	--	91%	60%	--	--

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BASE-NEUTRAL EXTRACTABLES RESULTS   ND = NOT DETECTED   ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-123M 3RD QTR	1-123M 4TH QTR DF=1.6	1-123M DUP 4TH QTR DF=1.33	1-180M 1ST QTR DF=100	1-180M 2ND QTR DF=40	1-192M 1ST QTR DF=100
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	4.0	6.9	5.6	ND	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	‡12.0	ND
14	2-METHYLNAPHTHALENE	.5	3.2	3.3	3.3	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	2.5	1.6	2.2	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	‡.4	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	5.1	ND	ND	ND	ND	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-123M 3RD QTR	1-123M 4TH QTR DF=1.6	1-123M DUP 4TH QTR DF=1.33	1-180M 1ST QTR DF=100	1-180M 2ND QTR DF=40	1-192M 1ST QTR DF=100	1-192M 2ND QTR DF=16
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT							
48	NITROBENZENE-D5	50 UG/L	44%	94%	103%	--	--	--	--
49	2-FLUOROBIPHENYL	50 UG/L	35%	87%	65%	--	--	--	--
50	4-TERPHENYL-D14	50 UG/L	92%	51%	82%	--	--	--	--

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-192.5M 3RD QTR	1-192M 4TH QTR DF=16	1-207M 1ST QTR DF=7.5	1-207M 2ND QTR DF=114	1-207M 3RD QTR	1-207M 4TH QTR DF=1.33
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	476.0	194.0	#3.8	ND	5.9	5.4
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	88.9	47.5	ND	ND	3.9	4.3
15	1-METHYLNAPHTHALENE	.5	73.8	37.4	ND	ND	3.3	3.0
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	ND	24.9	ND	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	#10.1	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	ND	ND	ND	ND	ND	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-192.5M 3RD QTR	1-192M 4TH QTR DF=16	1-207M 1ST QTR DF=7.5	1-207M 2ND QTR DF=114	1-207M 3RD QTR	1-207M 4TH QTR DF=1.33	1-228M 3RD QTR
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND	ND	ND
SURROGATE STANDARD RECOVERIES:		AMOUNT							
48	NITROBENZENE-D5	50 UG/L	98%	--	63%	--	47%	52%	139%
49	2-FLUOROBIPHENYL	50 UG/L	85%	--	73%	--	57%	79%	73%
50	4-TERPHENYL-D14	50 UG/L	82%	--	102%	--	87%	89%	119%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-228M 4TH QTR	1-240M 1ST QTR DF=7.5	1-240M 4TH QTR DF=1.33	1-271.5M 1ST QTR DF=7.5	1-291M 1ST QTR DF=7.5
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	1.0	ND	1.5	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	ND	ND	ND
15	1-METHYLNAPHTHALENE	.5	*.2	ND	ND	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	ND	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	ND	19.4	ND	12.7	10.5
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	ND	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	ND	ND	ND	ND	ND

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BASE-NEUTRAL RESULTS (CONT'D) ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-228M 4TH QTR	1-240M 1ST QTR DF=7.5	1-240M 4TH QTR DF=1.33	1-271.5M 1ST QTR DF=7.5	1-291M 1ST QTR DF=7.5
41	DI-N-OCTYL PHTHALATE	1.0	ND	ND	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT					
48	NITROBENZENE-D5	50 UG/L	49%	29%	45%	65%	37%
49	2-FLUOROBIPHENYL	50 UG/L	59%	49%	62%	83%	47%
50	4-TERPHENYL-D14	50 UG/L	92%	70%	32%	73%	59%

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	WESTBAY 1ST QTR DBH QA/QC	MDMW-1-R1 1ST QTR DBH QA/QC	MDMW-1-R2 2ND QTR DBH QA/QC	MDMW-1-R3 3RD QTR DBH QA/QC	MDMW-1-R4 4TH QTR DBH QA/QC
1	BIS(2-CHLOROETHYL)ETHER	.5	ND	ND	ND	ND	ND
2	1,3-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND
3	1,4-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND
4	1,2-DICHLOROBENZENE	.5	ND	ND	ND	ND	ND
5	BIS(2-CHLOROISOPROPYL)ETHER	2.0	ND	ND	ND	ND	ND
6	HEXACHLOROETHANE	2.0	ND	ND	ND	ND	ND
7	N-NITROSODI-N-PROPYLAMINE	5.0	ND	ND	ND	ND	ND
8	NITROBENZENE	.5	ND	ND	ND	ND	ND
9	ISOPHORONE	.5	ND	ND	ND	ND	ND
10	BIS(2-CHLOROETHOXY)METHANE	.5	ND	ND	ND	ND	ND
11	1,2,4-TRICHLOROBENZENE	1.0	ND	ND	ND	ND	ND
12	NAPHTHALENE	.5	ND	ND	4.5	ND	ND
13	HEXACHLOROBUTADIENE	2.0	ND	ND	ND	ND	ND
14	2-METHYLNAPHTHALENE	.5	ND	ND	6.9	ND	ND
15	1-METHYLNAPHTHALENE	.5	ND	ND	5.2	ND	ND
16	HEXACHLOROCYCLOPENTADIENE	2.0	ND	ND	ND	ND	ND
17	2-CHLORONAPHTHALENE	.5	ND	ND	ND	ND	ND
18	ACENAPHTHYLENE	.5	ND	ND	ND	ND	ND
19	DIMETHYL PHTHALATE	.5	ND	ND	ND	ND	ND
20	2,6-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND
21	ACENAPHTHENE	.5	ND	ND	ND	ND	ND
22	2,4-DINITROTOLUENE	2.0	ND	ND	ND	ND	ND
23	FLUORENE	.5	ND	ND	ND	ND	ND
24	4-CHLOROPHENYL PHENYL ETHER	1.0	ND	ND	ND	ND	ND
25	DIETHYL PHTHALATE	.5	ND	ND	ND	ND	ND
26	N-NITROSODIPHENYLAMINE	.5	ND	ND	ND	ND	ND
27	AZOBENZENE	.5	ND	ND	ND	ND	ND
28	4-BROMOPHENYL PHENYL ETHER	2.0	ND	ND	ND	ND	ND
29	HEXACHLOROBENZENE	2.0	ND	ND	ND	ND	ND
30	PHENANTHRENE	.5	ND	ND	1.3	ND	ND
31	ANTHRACENE	.5	ND	ND	ND	ND	ND
32	DI-N-BUTYL PHTHALATE	.5	25.9	15.5	0.6	ND	ND
33	FLUORANTHENE	.5	ND	ND	ND	ND	ND
34	BENZIDINE	15.0	ND	ND	ND	ND	ND
35	PYRENE	.5	ND	ND	ND	ND	ND
36	BENZYL BUTYL PHTHALATE	2.0	9.4	ND	ND	ND	ND
37	BENZO(A)ANTHRACENE	1.0	ND	ND	ND	ND	ND
38	CHRYSENE	1.0	ND	ND	ND	ND	ND
39	3,3'-DICHLOROBENZIDINE	5.0	ND	ND	ND	ND	ND
40	BIS(2-ETHYLHEXYL)PHTHALATE	1.0	6.6	ND	ND	ND	ND

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BASE-NEUTRAL EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	WESTBAY 1ST QTR DBH QA/QC	MDMW-1-87 1ST QTR DBH QA/QC	MDMW-1-R2 2ND QTR DBH QA/QC	MDMW-1-R3 3RD QTR DBH QA/QC	MDMW-1-R4 4TH QTR DBH QA/QC
41	DI-N-OCTYL PHTHALATE	1.0	1.2	1.1	ND	ND	ND
42	BENZO(B)FLUORANTHENE	1.0	ND	ND	ND	ND	ND
43	BENZO(K)FLUORANTHENE	1.0	ND	ND	ND	ND	ND
44	BENZO(A)PYRENE	2.0	ND	ND	ND	ND	ND
45	INDENO(1,2,3-CD)PYRENE	2.0	ND	ND	ND	ND	ND
46	DIBENZO(A,H)ANTHRACENE	2.0	ND	ND	ND	ND	ND
47	BENZO(GHI)PERYLENE	2.0	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT					
48	NITROBENZENE-D5	50 UG/L	39%	51%	--	19%	40%
49	2-FLUOROBIPHENYL	50 UG/L	46%	58%	--	18%	47%
50	4-TERPHENYL-D14	50 UG/L	226%	84%	--	46%	87%

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES

	COMPOUND	AMOUNT UG/L	1-R3 3RD QTR
1	BIS(2-CHLOROETHYL)ETHER	50.0	83
2	1,3-DICHLOROBENZENE	50.0	71
3	1,4-DICHLOROBENZENE	50.0	72
4	1,2-DICHLOROBENZENE	50.0	71
5	BIS(2-CHLOROISOPROPYL)ETHER	50.0	80
6	HEXACHLOROETHANE	50.0	78
7	N-NITROSODI-N-PROPYLAMINE	50.0	75
8	NITROBENZENE	50.0	102
9	ISOPHORONE	50.0	107
10	BIS(2-CHLOROETHOXY)METHANE	50.0	70
11	1,2,4-TRICHLOROBENZENE	50.0	65
12	NAPHTHALENE	50.0	66
13	HEXACHLOROBUTADIENE	50.0	53
14	2-METHYLNAPHTHALENE	50.0	73
15	1-METHYLNAPHTHALENE	50.0	72
16	HEXACHLOROCYCLOPENTADIENE	50.0	28
17	2-CHLORONAPHTHALENE	50.0	71
18	ACENAPHTHYLENE	50.0	61
19	DIMETHYL PHTHALATE	50.0	43
20	2,6-DINITROTOLUENE	50.0	73
21	ACENAPHTHENE	50.0	61
22	2,4-DINITROTOLUENE	50.0	77
23	FLUORENE	50.0	60
24	4-CHLOROPHENYL PHENYL ETHER	50.0	52
25	DIETHYL PHTHALATE	50.0	48
26	N-NITROSODIPHENYLAMINE	50.0	56
27	AZOBENZENE	50.0	74
28	4-BROMOPHENYL PHENYL ETHER	50.0	56
29	HEXACHLOROBENZENE	50.0	60
30	PHENANTHRENE	50.0	66
31	ANTHRACENE	50.0	67
32	DI-N-BUTYL PHTHALATE	50.0	50
33	FLUORANTHENE	50.0	73
34	BENZIDINE	50.0	
35	PYRENE	50.0	84
36	BENZYL BUTYL PHTHALATE	50.0	81
37	BENZO(A)ANTHRACENE	50.0	82
38	CHRYSENE	50.0	78
39	3,3'-DICHLOROBENZIDINE	50.0	44
40	BIS(2-ETHYLHEXYL)PHTHALATE	50.0	91

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SPIKED BASE-NEUTRAL SAMPLES - PERCENT RECOVERIES (CONTINUE

	COMPOUND	AMOUNT UG/L	1-R3 3RD QTR
41	DI-N-OCTYL PHTHALATE	50.0	91
42	BENZO(B)FLUORANTHENE	50.0	84
43	BENZO(K)FLUORANTHENE	50.0	88
44	BENZO(A)PYRENE	50.0	91
45	INDENO(1,2,3-CD)PYRENE	50.0	90
46	DIBENZO(A,H)ANTHRACENE	50.0	82
47	BENZO(GHI)PERYLENE	50.0	92

	SURROGATE STANDARD RECOVERIES:	AMOUNT	
48	NITROBENZENE-D5	50 UG/L	89
49	2-FLUOROBIPHENYL	50 UG/L	146
50	4-TERPHENYL-D14	50 UG/L	80

APPENDIX K4

Borehole MDMW-1
Acid Extractables

Analyses by:

Barringer-Magenta Ltd.
Rexdale, Ontario

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	MD-1 1ST QTR DF=1000	MDMLS-1 1ST QTR	MDMLS-2 1ST QTR	1-61.5M 2ND QTR DF=1.6	1-61.5M 3RD QTR	1-61.5M 4TH QTR DF=1.6
1	PHENOL	.5	2400.0	129.0	2.6	2290.0	1010.0	2480.0
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	2.2	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	6.7	ND	45.8	26.9	17.7
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	6.6	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT						
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	--	55%	20%	--	3%	57%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	--	--	--	69%	51%	70%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-75M 1ST QTR DF=100	1-75M 2ND QTR DF=16	1-75M DUPL 2ND QTR DF=10	1-75M 3RD QTR	1-75M 4TH QTR DF=1.6	1-123M 1ST QTR DF=100
1	PHENOL	.5	2290.0	1240.0	958.0	1280.0	6120.0	1310.0
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	18.8	ND	25.1	21.4	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT						
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	--	--	--	8%	66%	--
13	1,2,3-TRIBROMOPHENOL	50 UG/L	--	--	--	56%	70%	--

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-123M 3RD QTR	1-123M 4TH QTR DF=1.6	1-123M DUP 4TH QTR DF=1.33	1-180M 1ST QTR DF=100	1-180M 2ND QTR DF=40	1-192.5M 1ST QTR DF=100	1-192M 2ND QTR DF=16
1	PHENOL	.5	1510.0	4420.0	4560.0	1640.0	3080.0	31000.0	30900.0
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	28.9	49.7	48.6	ND	ND	ND	922.0
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT	1-123M 3RD QTR	1-123M 4TH QTR DF=1.6	1-123M DUP 4TH QTR DF=1.33	1-180M 1ST QTR DF=100	1-180M 2ND QTR DF=40	1-192.5M 1ST QTR DF=100	1-192M 2ND QTR DF=16
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	12%	102%	113%	--	--	--	--
13	1,2,3-TRIBROMOPHENOL	50 UG/L	57%	84%	61%	--	--	--	--

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED * = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-192.5M 3RD QTR	1-192M 4TH QTR DF=16	1-207M 1ST QTR DF=7.5	1-207M 2ND QTR DF=114	1-207M 3RD QTR	1-207M 4TH QTR DF=1.33	1-228 3RD QT
1	PHENOL	.5	37400.0	39700.0	132.0	ND	90.7	206.0	5.5
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	1020.0	830.0	ND	ND	8.1	9.2	3.5
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT							
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	55%	--	63%	--	31%	56%	42%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	88%	--	71%	--	31%	65%	14%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED ‡ = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. UG/L	1-228M 4TH QTR	1-240M 1ST QTR DF=7.5	1-240M 4TH QTR DF=1.33	1-271.5M 1ST QTR DF=7.5	1-291M 1ST QTR DF=7.5
1	PHENOL	.5	3.9	ND	2.3	ND	5.2
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	2.0	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND
	SURROGATE STANDARD RECOVERIES:	AMOUNT					
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	54%	37%	48%	63%	28%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	55%	50%	47%	57%	50%

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ACID-EXTRACTABLES RESULTS ND = NOT DETECTED # = COMPOUND DETECTED AT A LEVEL BELOW THE STATED M.D.L.

	COMPOUND	M.D.L. US/L	WESTBAY 1ST QTR DBH QA/QC	MDMW-1-R1 1ST QTR DBH QA/QC	MDMW-1-R2 2ND QTR DBH QA/QC	MDMW-1-R3 3RD QTR DBH QA/QC	MDMW-1-R4 4TH QTR DBH QA/QC
1	PHENOL	.5	ND	ND	0.6	ND	ND
2	2-CHLOROPHENOL	1.0	ND	ND	ND	ND	ND
3	2-NITROPHENOL	2.0	ND	ND	ND	ND	ND
4	2,4-DIMETHYLPHENOL	1.0	ND	ND	ND	ND	ND
5	2,4-DICHLOROPHENOL	10.0	ND	ND	ND	ND	ND
6	4-CHLORO-3-METHYL PHENOL	15.0	ND	ND	ND	ND	ND
7	2,4,6-TRICHLOROPHENOL	10.0	ND	ND	ND	ND	ND
8	2,4-DINITROPHENOL	15.0	ND	ND	ND	ND	ND
9	4-NITROPHENOL	15.0	ND	ND	ND	ND	ND
10	2-METHYL-4,6-DINITROPHENOL	15.0	ND	ND	ND	ND	ND
11	PENTACHLOROPHENOL	15.0	ND	ND	ND	ND	ND

SURROGATE STANDARD RECOVERIES:

		AMOUNT					
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	71%	49%	--	14%	41%
13	1,2,3-TRIBROMOPHENOL	50 UG/L	59%	51%	65%	7%	52%

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SPIKED ACID EXTRACTABLES SAMPLES - PERCENT RECOVERY

	COMPOUND	AMOUNT UG/L	1-R3 3RD QTR
1	PHENOL	50.0	67
2	2-CHLOROPHENOL	50.0	76
3	2-NITROPHENOL	50.0	73
4	2,4-DIMETHYLPHENOL	50.0	29
5	2,4-DICHLOROPHENOL	50.0	65
6	4-CHLORO-3-METHYL PHENOL	50.0	69
7	2,4,6-TRICHLOROPHENOL	50.0	61
8	2,4-DINITROPHENOL	50.0	41
9	4-NITROPHENOL	50.0	46
10	2-METHYL-4,6-DINITROPHENOL	50.0	71
11	PENTACHLOROPHENOL	50.0	57

SURROGATE STANDARD RECOVERIES:

		AMOUNT	
12	A,A,A-TRIFLUORO-M-CRESOL	50 UG/L	<1
13	1,2,3-TRIBROMOPHENOL	50 UG/L	32

APPENDIX K5

Borehole MDMW-1
Organochlorine Compounds

Analyses by:

Barringer-Magenta Ltd.
Rexdale, Ontario

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED ‡ = CALCULATED FROM ONE COLUMN # = COULD NOT BE CALCULATED

COMPOUND	M.D.L. UG/L	MD-1 1ST QTR	MDMLS-1 1ST QTR	MDMLS-1 1ST QTR QC-REPEAT	MDMLS-2 1ST QTR	1-61.5M 2ND QTR DF=100	1-61.5M 3RD QTR	1-61.5M 4TH QTR
1 HEXACHLOROBENZENE	.0010	#.0000	#.0000	#.0000	‡.0060	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	0.0016
3 ALDRIN	.0005	‡.0031	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	1-75M 2ND QTR DF=100	1-75M DUPL 2ND QTR DF=10	1-75M 3RD QTR	1-75M 4TH QTR	1-123M 2ND QTR DF=1000	1-123M 3RD QTR	1-123M 4TH QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	1-123M DUP 4TH QTR	1-180M 1ST QTR DF=20000	1-192.5M 1ST QTR DF=1000	1-192M 2ND QTR DF=1000	1-192.5M 3RD QTR	1-192M 4TH QTR	1-207M 1ST QTR DF=1000
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED # = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	1-207M 2ND QTR DF=1000	1-207M 3RD QTR	1-207M 4TH QTR	1-228M 3RD QTR	1-228M 4TH QTR	1-240M 4TH QTR
1 HEXACHLOROBENZENE	.0010	ND	ND	ND	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	ND	ND	ND	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND	ND

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ORGANOCHLORINE COMPOUNDS RESULTS ND = NOT DETECTED * = AMOUNT CALCULATED FROM A SINGLE COLUMN

COMPOUND	M.D.L. UG/L	WESTBAY 1ST QTR DBH QA/QC	MDMW-1-R1 1ST QTR DBH QA/QC	MDMW-1-R2 2ND QTR DBH QA/QC	MDMW-1-R3 3RD QTR DBH QA/QC	MDMW-1-R4 4TH QTR DBH QA/QC
1 HEXACHLOROBENZENE	.0010	0.0010	*.0024	ND	ND	ND
2 HEPTACHLOR	.0005	ND	ND	ND	ND	ND
3 ALDRIN	.0005	ND	0.0011	*.0030	ND	ND
4 OCTACHLOROSTYRENE	.0010	ND	ND	ND	ND	ND
5 PP'-DDE	.0005	ND	ND	ND	ND	ND
6 MIREX	.0010	ND	ND	ND	ND	ND
7 TOTAL PCB'S	.0100	ND	ND	ND	ND	ND

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SPIKED ORGANOCHLORINE SAMPLES - PERCENT RECOVERIES

COMPOUND	AMOUNT UG/L	1-R3 3RD QTR
1 HEXACHLOROBENZENE	0.0250	
2 HEPTACHLOR	0.0250	
3 ALDRIN	0.0250	
4 OCTACHLOROSTYRENE	0.0250	
5 PP'-DDE	0.0250	
6 MIREX	0.0700	
7 TOTAL PCB'S	0.2500	100